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Computing WEEKLY

6-12 December 1984

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Vol 3 No 49

Atari 800XL price slashed

ATARI has further slashed the price of the Atari 800XL (see *Popular Computing Weekly*, November 22).

The retail price is now down to £129, a reduction of almost 25% from its previous price of £169.

The new price follows the announcement three weeks ago in the States that the 800XL would sell for just \$120 (about £100) over there.

The aggressive price cutting of the 800XL — Atari's only home computer in the Christmas market now that the 600XL model has been dropped — reflects Atari boss Jack Tramiel's policy of "marketing

for the masses".

"Manufacturing advances in high technology products mean that prices should be tumbling," commented Tramiel.

"Technology is what this decade is about. I've given this notion to my factories out in the Far East. They're going to produce it at the price the man next door can afford."

Atari factories worldwide are currently producing about ten million machines per year. A large proportion of these are targeted for the European market for 1985. Atari has recently appointed a European marketing manager, M Rosi.



Further bargains for the Atari 800XL are available if you shop around. Laskey's, for instance, has an Atari Starter pack consisting of the computer, a joystick, data recorder, Introduction to Basic manual and one piece of software — which can be chosen from a selection — all for £170.

Prestel breached

PRESTEL, the British Telecom database, has suffered a second serious breach of its security.

On Sunday night a group of 'hackers' broke into Micronet only days after Prestel installed new security codes claimed to be unbreakable.

The 'hackers' took action after Prestel removed its second biggest information provider — Timeframe — from the system. Timeframe was asked by Prestel to withdraw a claim

continued on page 5

Minter lights up

JEFF MINTER, author of Llama-soft Commodore classics including *Sheep in Space* and *Attack of the Mutant Camels* is soon to release his first non-games title for the C64 — to be called *Psychedelia*.

The program is best described as a light synthesiser, where the user can create moving patterns of ever changing colour on screen (best done listening to a favourite LP) using a joystick.

The program operates much like a sound synthesiser — only with light — and it is



continued on page 5



Oric's new IQ164 computer — details inside.

INSIDE > **MIDI KEYBOARD** > **ADVENTURE COMPETITION** >

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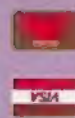
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ANSAFONE



I was thinking of buying a micro this Christmas I would be looking pretty closely at the Atari 800XL.

Atari last week slashed its price once again so that it now costs only £129 — the same price as the 48K Spectrum.

Yet the Atari has 64K Ram and offers a number of features found only on more expensive machines — it has a better keyboard than the Spectrum Plus which costs £179. It has four sound channels, one more than the Commodore 64 which costs £199. The Spectrum models have only a one-voice squeak. The 800XL has a cartridge port and twin joystick ports, unlike the Spectrum models. It even has a monitor socket, sprite graphics and a display with up to 256 colours on screen at any one time.

In the words of Atari's latest ad the 800XL has now well and truly "socked the competition".

It's a big gamble. Before Jack Tramiel — Commodore's founder — split away and bought Atari in June the company had been losing \$800m a year.

He has worked quickly. We now have a considerably slimmed down Atari that is proving to be very aggressive in the market. He has just borrowed a further \$150m from his US investors push Atari back into the limelight. "Too many people have got too fat out of this business", he says.

The only problem with the Atari 800XL is software. The best programs are still unquestionably to be found on the Spectrum and Commodore 64 machines. Still, that should come if Tramiel's plan works.

The Atari 800X is now a very attractive purchase at £129. It makes Sinclair's Spectrum Plus — without either ZX Interface 1 or 2 built-in — look a bit mean, and the Commodore 64 look very overpriced.

It makes the £275-plus MSX micros look like no-hopers.

Presents...

News Oric's new IQ164 > Spectrum + problems

Competition > Adventure competition to win *The Sandman Cometh*

Star Game > Ashley Watson challenges your piloting skills with *Lunar Module* on the Dragon 32

Software Review > McGraw Hill's QL Assembler reviewed by Andy Pennell > Psion's Matchpoint on the C64

Streetlife > Christina Erskine views robots in action at Ford Motors on the Sierra line

Hardware Reviews > Disc interface for Spectrum > Siel MK900 music keyboard

Spectrum > Reverse your Polish on any Spectrum thanks to Richard Armstrong

Commodore 64 > A parallel printing routine from Adrian Warman

BBC & Electron > How to print out user defined graphics on your Epson

Amstrad > The depths (and heights) of the Amstrad CPC 464 revealed by Colin Harris of Nemesis Software

Best of the Rest > Letters 9 > Dragon 45 > Flight Simulator Result 51 > QL Page 60 > Elite Competition 64 > Open Forum 72 > Arcade Avenue 72 > Microradio 75 > Baud Walk 76 > Music Box 78 > Book Ends 80 > Peek & Poke 84 > Adventure Corner 84 > Readers Chart 98 > Top Ten, Diary 98 > New Releases, This Week 99 > Ziggurat, Puzzle, Hackers 102

Futures...

Which MSX? We spot the differences... And a machine-code taster of Jeff Minter's new *Psychodelia* to type in

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ABC

56,052 copies sold every week
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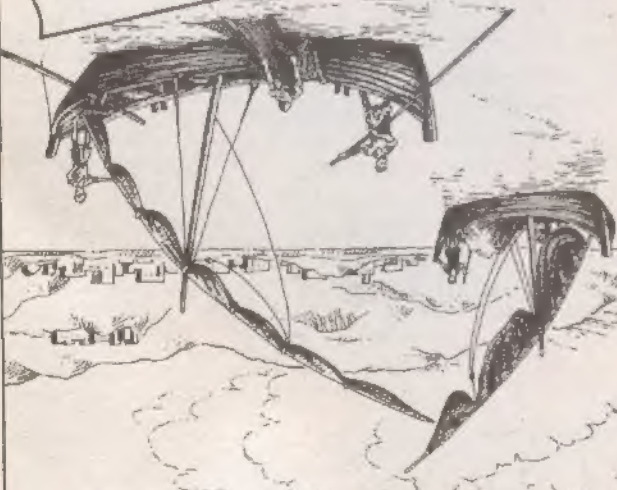
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SHARDS SOFTWARE PRESENTS ...

Psychodelia

continued from page one

possible to produce pre-programmed sequencing, and pre-set shapes. You can define the starting shape from which the program constructs its patterns and you can control the colour rotation sequence.

A number of built-in 'planes of symmetry' can be switched in or out to produce multiple images on-screen.

Further variation can be achieved by altering the bandwidth and the pulse length of the shape 'trail' which changes how the joystick effects the patterns. Finally, it is possible to record pattern sequences and then play them back.

"I enjoy writing games but I wanted to write something totally non-competitive but at the same time great fun to play and experiment with," explained Jeff Minter.

Psychodelia is being released in mid-December for the Commodore 64, C16 (which has a 128-colour display) and Vic20, priced at £7.95.

QL releases

IN THE same week as Psion's QL chess program is to be released Sinclair has announced a number of other new QL titles, which will become available before January.

An assembler package has been produced by GST which will be priced at £39.95.

QL Toolkit written by Tony Tebby and Sinclair adds 60 new commands to SuperBasic including full multi-tasking. *QL Toolkit* will sell for £24.95.

QL Cash Trader written by Accounting Software giving a dynamic profit/loss accounting system will sell for £39.95.

Finally, *QL Linker* from GST is a relocating linker for programs written in compiled languages of M68000 assembler.

CPC464 Forth

NEW hardware and software products have been announced for the Amstrad CPC464 by Skywave.

The company has produced an RS232 communications interface priced at £71.30, and also a Forth (Forth standard) language package on cassette, priced at £20.70, for the machine.

Details from Skywave, 73 Curzon Road, Boscombe, Bournemouth.

New IQ164 details

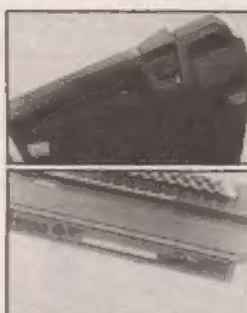
THE new IQ164 Oric machine, due for launch in January on the continent (as the Stratos) and in the UK shortly afterwards, will be priced around £250.

The machine looks remarkably similar to the Atmos, using the same keyboard and black and red colouring on the casing.

The two cartridge slots on the upper left-hand side will offer a total of 112K Rom space for languages and applications programs. The machine contains no internal Rom — Basic is provided on a plug-in cartridge.

When Basic is used the function key can be used simultaneously with the other keys to give a single Basic keyword entry.

The machine also offers a Centronics printer interface,



two modem ports — one RS232, one V23, two Atari-style joystick ports, a cassette socket and both UHF and RGB/Peritel TV connections. It has a built-in disc controller and a Sugart 34-pin interface — giving the option to use Sinch discs as well as Oric's Sinch Hitachi-based discs.

Spectrum+ hits snag

SINCLAIR's Spectrum+ computer has run into reliability problems and the number of faulty machines has resulted in a severe shortage of the micro in the shops.

"The shortage of Spectrum+ machines is having a devastating effect on the Christmas market," said John Flatman, of Boots' computer buying department. "People are waiting until the machine finally arrives rather than buying an ordinary Spectrum, and it seems there are severe quality problems with the machine."

At W H Smith, a spokeswoman confirmed that the shops were not getting as many machines as they needed.

"We have been having problems with the keyboard in that many of the keys seem to be loose. Consequently, we have been looking at them and tes-

The Net spreads

MICRONET 800 is expanding abroad. A franchise to run Micronet has been given to the Hong Kong telephone company and Swedish PTT.

The Swedish franchise will make Micronet available to users in Sweden, Norway and Denmark.

Micronet's managing director, Tim Schoonmaker, says this is just the beginning. "Our next target is to take Micronet 800 to micro users in Australia and the United States."

ting them as they come out of the boxes.

"Recently the problems haven't been quite so bad as they were to begin with, and we are beginning to get replacements, though not enough."

"I am not aware that the situation is at all difficult at the moment," said Sinclair spokesman. "My impression is that things are a lot more positive this year than they were twelve months ago."



Prestel

continued from page one

that Prestel's security had been broken and when they failed to comply Prestel removed them from the system.

Angry hackers then succeeded in breaking into Micro-mouse on Micronet leaving the message "Bring back Time-frame — back of the century".

The same group is also apparently attempting to break into BT's prestige information service BT Gold.

Elite bugged

THE Electron version of *Elite*, Acornsoft's top selling game has run into problems.

A bug has been found that means Hyperdrive between galaxies is impossible in the cut-down Electron version, making the playing area an eighth the size of its BBC counterpart.

An Acornsoft spokesperson commented "the single galaxy restriction does not affect the actual playing of the game. It is still possible to achieve Elite status."

Acornsoft Managing Director, David Johnson-Davies explained further:

"There is a bug in the program that means the game is played in one galaxy, but this does not affect the playing of the game — Elite status can still be attained."

"We regret the bug is present but, given the complexity of the game, it is difficult to guarantee the lack of bugs."

"However, if customers feel strongly about the matter, we will refund their money."

Acornsoft says that it is currently working to cure the problem and is looking at the possibility — if an eight-galaxy version can be produced — of replacing one-galaxy copies already sold with the corrected version.

Until it is known whether or not the problem can be solved, Acornsoft have no plans to alter the documentation supplied with the game, despite the fact that it clearly states that Hyperdrive is possible.

Micronet

Following last week's News Desk item headed *QL network by Prism*, we would like to make clear that Prism no longer has any connection with Micronet which is run jointly by EMAP and British Telecom.

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BBC ROMS

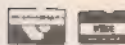
Wordwise—Simple to use professional word processor
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PRINTERMASTER ROMS

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AIRWOLF is the latest game from Elite Systems based on the ITV series of the same name.

The player must guide his helicopter through 12 playing

screens to rescue, one by one, six kidnapped scientists.

The program will be available this month for the Spectrum priced at £6.95, and the Commodore 64 at £7.95.

● Following the Elite launch, advertisements for a forthcoming Ocean game, also entitled *Airwolf* have been withdrawn.



Sir Clive goes on show

A WAXWORK model of Sir Clive Sinclair will be on show in Madame Tussauds from next April.

Work on 'Sir Clive' himself has now been completed, but he will not be put on display until a model of Selina Scott is finished, as the two will appear in a tableau together.

"Sir Clive will be shown holding one of the Sinclair pocket TVs," explained a spokeswoman for Madame Tussauds. "Selina Scott will be looking over his shoulder, looking at the TV screen, on which there will be a picture of herself."

Free bundles

TOSHIBA is currently offering three software packs bundled free with its new Toshiba HX-10 MSX computer.

The three packs are CDS Micro Systems *French is Fun*, Ocean's *Hunchback* and *Manic Miner* from Bug Byte.

"These three were chosen largely because we wanted chart-topping products, such as *Manic Miner*," said a Toshiba spokesman. "But we are keen to emphasise that MSX does not just mean games machines, so *French is Fun* was added to the list."

Learn to read ...

SINCLAIR has released a further 13 educational titles for the Spectrum and Spectrum+.

Two — *Estimator Racer* and *Number Painter* — are ASK titles produced in association with Psion and priced at £4.95.

The remaining 11 at £7.95 are Sinclair Macmillan programs. Four of these are science simulations written by Five Ways and five are additions to the Learn to Read series from Fisher Marriot.

Tickets still to be claimed

A NUMBER of winning raffle tickets from the 14th ZX Micro-fair held on November 17 to 18 are still unclaimed.

The prize winning ticket numbers are as follows:

Green — 570, 582, 589, 834, 768, 879, 474, 993, 618, 871, 949, 525, 472, 309, 736, 697, 496, 584, 494, 817, 347, 303, 582, 900, 564, 478, 382, 271, 557, 275, 296, 430, 632, 347, 679, 711, 820, 946, 303.
Red — 770, 395, 506, 454, 645, 612, 515, 458, 960, 628, 782, 763, 402, 461, 475, 413, 455, 503, 493, 473, 372, 389, 413, 600, 411, 524, 508, 438, 611.
White — 230, 344, 201, 140, 503, 564, 498, 383, 680, 339, 602, 690, 120, 693, 474, 254, 89, 110, 148, 422, 200, 204, 148, 64, 187, 422.
Blue — 34, 111, 73.

The raffle, in aid of Capital Radio's 'Help a London Child' raised over £700 for London children in need.

The first prize was won by Mr M Statford of S Croydon, Surrey.

If your ticket number appears above write to: ZX Raffle, 71 Park Lane, Tottenham, London N17 0HC, enclosing the ticket and a label with your name and address.

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QLUB fights back

In answer to the several points raised in R. Haigh's letter in the November 15 issue, Sinclair Research should like to point out that:

1) The second QLUB News was distributed on November 12 and our records confirm that R Haigh was part of that mailing.

2) The new-version Psion update will be offered free of charge to QLUB members as part of their membership entitlement. We may subsequently offer these up-dated versions to non-QLUB members but there would be a charge.

3) While R Haigh may feel that he does not need Psion software assistance, experience to date suggests that a large number of QLUB members do very much value this service — so far some 8,000 enquiries have been handled.

QLUB Editor
Sinclair Research
Cambridge

Ultimate news 1

I am writing this letter to put Mr N Brailsford who asked about Ultimate games on the 64, out of his misery. Ultimate have already produced a version of Jet Pac on disc — although I must admit that my Jet Pac is a pirate copy of a pre-release version.

PS Ultimate have released a game called The Staff of Karnath for the 64.

PE Sorry about the pirate version, Ultimate!

D Page
2 Park Approach
Welling
Kent

Ultimate news 2

I wish to stake my claim to be the first person to complete Ultimate's new Megagame/Movie/Classic program Knight Lore. After two weeks of solid playing I stirred in the last charm and was cured. This historic event (I) took place on Friday the 23rd of November at 6.19pm for those who wish to challenge my

claim. I won't say exactly what happens as it will spoil the aim of the game for other people. Seeing as the cassette inlay is so vague, as are reviews, here are a few playing tips:

- 1) You need two of each of the seven charms.
- 2) You must drop them in the cauldron in the correct order.
- 3) This is indicated by the cauldron steam.
- 4) You can't have three or more objects in a room.
- 5) You can drop and pick up, objects simultaneously.
- 6) Keep track of what you have collected.
- 7) Make a map!

Andrew Wappat
15 Darngate
Longthorpe
Peterborough

Misleading review

Your Book Ends review of Adrian Dickens' The QL Advanced User Guide (Popular Computing Weekly, November 15) is extremely misleading in its references to the 'Sinclair QDOS manual'.

This manual was in fact a preliminary draft of the QDOS documentation — a working piece of documentation which has never been published in any official form. It has been supplied by Sinclair Research Limited only to software houses who have applied for it.

Anyone subsequently seeking permission to quote from the manual has been warned of possible errors, and permi-

tied to proceed only and entirely at their own risk, on condition that Sinclair's copyright in the material is acknowledged.

Sinclair expects to publish shortly its own comprehensive official Software Developers Guide.

Software Department
Sinclair Research
Cambridge

Imagine a micro

Even in the advanced digital microcomputer world we still have an electro-mechanical problem — the mass storage devices called disc drives.

A low-priced home micro costs around £150 — the disc drive which goes with it still costs up to £230. For the non-professional user a disk drive therefore seems rather expensive for what it does — storing and retrieving data — in comparison with the multitude of basic functions of the micro-keyboard, video-control, music, programming.

To be complete a drive has also secondary functions: the organisation of the data (Copy, Delete, Merge, Directory). It is these functions which make the drive so expensive.

Supposing it was possible to execute these secondary functions inside the computer without intervention of the mass storage device after the data is loaded.

I imagine a micro with 812K Ram and a fast tape or streamer as a mass storage device. Loading and saving memory would only be possible in sequential blocks of a fixed length: say, 192K Ram. This would make the tape operation very simple — a computer controlled start at the beginning and a stop at the end of the block. Without making the streamer too expensive it still must be possible to Load or Save a block in less than 15 second. Organising the data before saving would also be very easy, it would only be a matter of changing the data locations in the memory. Random accessing would no longer be a time consuming operation. With 812K Ram as memory it would be possible to

have two of the memory blocks present in the computer for merging and copying files. Moreover the DOS could be replaced by a simple, short menu-driven program.

It must be possible to build and sell a micro like this with a built-in fast tape unit for less than the cost of a micro plus disc drive — £400.

Cormon Eddy
Hof Van Tichelen 26
B2020 Antwerp
Belgium

Is the QL the kind of machine you had in mind?

Dragon still fiery

I was very disappointed to read in last week's Popular Computer Weekly that you were surprised at the large turn-out at the 6809 show.

The Dragon is alive, well and kicking like mad with a lot of support from a lot of not so small companies — not to mention a lot of owners who obviously don't think the Dragons are dead.

So many reviewers in the computer press obviously never switched on their review samples of the Dragon. If the number of non-existent Rombugs they all found is anything to go by it amazes me that it sold at all.

The Dragon is without a doubt far superior to the BBC, Spectrum and QL (I nearly forgot the Spectrum Plus with its drop-off keys which allow one to completely redesign the keyboard layout) etc, which is why most magazines (including yourselves) seem to class as computers.

If only the reviewers had bothered to admit that all they did was read the manual and base their review on that we might still have Dragon Data. If I appear to be upset it is because I am very disappointed to see the computer press are still kicking the Dragon when it is (a little) down.

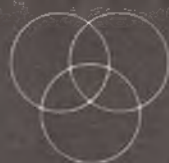
Long live the Dragon.

J E Slad
3 Bridges Close
St Nicholas-at-Wade
near Birchington
Kent



"What do you suppose Jack Tramiel's trying to do?"

LOGIC 3



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WINTER ISSUE 1984/85

WIN A MICRODRIVE

Christmas Competition
1st prize: ZX Microdrive & ZX Interface 1 (worth over £70)

2nd prize: Currah Speech Synthesizer (worth £29.90)

10 runner up prizes of free games software (each worth over £10)

To celebrate the Christmas season Logic 3 are running a grand Christmas Competition with a ZX Microdrive and Currah Speech Synthesizer as first and second prizes.

The ZX Microdrive, complete with Interface 1, is undoubtedly the ultimate Spectrum add-on to be allowing programs and data to be quickly saved and recalled. The Currah Speech is both powerful, featuring an infinite vocabulary, and easy to use.

To enter the competition carefully read the rules in this catalogue to find the questions in the Quiz and mail your answers to Logic 3. All entries received before 31st January will be eligible for the competition. Prizes will be awarded to the first 12 correct entries drawn.

Here's your chance to win these desirable Spectrum add-ons, but don't leave it too late, make sure your entry reaches Logic 3 before the closing date.

CLUB SUCCESS

The Logic 3 Spectrum Club was launched in July, 1984 and has been an outstanding success. Already more than half-way to its target of 10,000 members in twelve months, the continuous growth of the club has kept Logic 3's staff working seven days a week just to keep up with demand.

Tony Toller, Logic 3's managing director and coordinator of the Club, explains its success as follows: "With other clubs once a person has joined there is no more reason for the club to try to support its members who each month have to purchase a certain number of products from a short list. Our Club is different. Members have no obligation to purchase any products from the club so the pressure is on us to choose only the best quality products and offer the best possible prices. We also take a lot of pride in publishing independent reviews on all the products we carry and if we do not like something about a product we are not afraid to say so."

Tony Toller's policy of real service rather than just order business is winning new members all the time. But size by itself is not the main objective "as we grow so we will be able to improve our service to members still further and perhaps, one day, develop the club catalogue into a proper magazine."

With the Christmas edition of the catalogue already running at a bumper 20 pages containing reviews of more than 180 products that day may come quite soon!

INSIDE

* EDUCATION

A selection of the most effective educational programs available
Designed for children from the age of 4 to 16.

* GAMES

The best games for the Spectrum selected by our own review panel and rated according to: graphics, sound, colour, originality and interest.

* PROGRAMMING

The 'Learn BASIC' tutorials really show you how to write structured programs in easy to understand stages.

* UTILITIES

Design your own games.

* HARDWARE

Some good deals in hardware and peripherals.

LOGIC 3'S SOFTWARE PANEL

Ned Atkinson, pupil of St William Borlase School, spends his weekends in a shop selling home computer software, intends to work as a journalist.

Andrew Galt, director of Logic 3, spent 6 years with Unimodem's UK and International Division, 'Approved Product' scheme for third party software.

Bliss Huxley, graduate of London School of Economics, has translated business software into French. Currently working on the design of graphics for educational software.

Tony Toller, director of Logic 3, former journalist, specialist in business education, on Microns and co-ordinator of Logic 3's software club.

Spectrum Club

The Logic 3 Spectrum Club has something for everyone: regular reviews, excellent savings on all the latest top quality games and educational software, and discounts on hardware.

NEW MEMBERS INTRODUCTORY OFFER
Join Logic 3 Spectrum Club within 60 days and benefit from our new members introductory offer to purchase our 'Software Specials' at a huge discount.

MEMBERSHIP IS ONLY £3.00 PER YEAR
(Equivalent to only 25p per month)

TO JOIN FILL IN YOUR NAME AND ADDRESS ON THE ORDER FORM (OR ON A SEPARATE SHEET OF PAPER) AND SEND WITH YOUR £3.00 TO THE ADDRESS BELOW

MEMBERSHIP DEPT.
LOGIC 3
MOUNTBATTEN HOUSE
VICTORIA STREET
WINDSOR, BERKS

FREEPOST
(MEMBERSHIP DEPT)
LOGIC 3
MOUNTBATTEN HOUSE
VICTORIA STREET
WINDSOR
BERKS

Yes, please rush me a copy of your Software Club catalogue.

I have a ☐ ZX Spectrum ☐ Commodore 64 (tick box)

Name

Address

Perchance to dream

This week we offer you the chance to enter an intriguing adventure puzzle based on the new epic adventure, *The Sandman Cometh* by Star Dreams

The Prize

The Sandman Cometh is an adventure through the dark side of the mind, where logic is twisted and opposites meet. The objects of material reality are seen in strange new guises, the substance of the mental world holds sway.

To solve *The Sandman Cometh* you will need to learn the significance of dreams from Freud, symbols of reason from the world's greatest philosophers and jokes from the backs of matchboxes.

The Sandman Cometh is divided into two 48k Spectrum adventures. You are the dreamer searching for clues in a madstrom of mental turmoil — seeking only the means to wake up. There are quality graphics illustrating most of the stuff that dreams are made of, and a rich vocabulary.

The Bait

The Popular Computing Weekly school of hack psychology and fringe religion invites you to win five copies of the *The Sandman Cometh*. First prize will consist not only of the game itself but also a bottle of vintage champagne!

Venture into 1985 with sparkling harebuds and a contented expression. Ten runners-up will receive a useful Spectrum toolkit utility program from Star Dreams, creators of *The Sandman*.

What to do

The Sandman Cometh is no ordinary program and to win it you'll have to complete no ordinary competition. In each of the next two weeks issues (December 13 and 20) we will be publishing a rhyming couplet somewhere in *Adventure Helping*. In the third week — the January 3 issue — we will print a listing for a game that combines a quiz with an adventure. Complete the clues, explore the adventure make use of the enigmatic advice offered in the two rhyming couplets and you'll hear a tune.

How to enter

If you think you know the tune, name it, with a brief explanation of what you did to discover it (you can't get it just by looking at the listing incidentally) and send the details to Sandman Competition, *Popular Computing Weekly*, 12-13 Little Newport Street, London, WCH7PP by 1 February 1985. The first 15 senders of correct entries get the prizes and the editor's decision (as usual) is final.



★ A CRASH SMASH ★
 ▶ BARK STAR - HAS TO SAY THE LEAST STUNNINGLY FAST AND SMOOTH 3D VECTOR GRAPHICS ■ IT MUST SURELY WIN THE ACCOLADE AS THE FASTEST SPECTRUM GRAPHICS EVER ■

HOME COMPUTING WEEKLY
 FIVE STAR RATING ★ ★ ★ ★ ★

▶ SUPERB MOVING STAR EFFECTS ■ IT BECAME OBVIOUS THAT THIS WAS SOMETHING SPECIAL ■
 ★ ★ ★ ★ ★
 PERSONAL COMPUTING GAMES
 PC HIT ★ ★ ★

▶ I FOUND IT EXCITING AND COMPELLING AND KEPT WANTING TO HAVE JUST ONE MORE GO ■

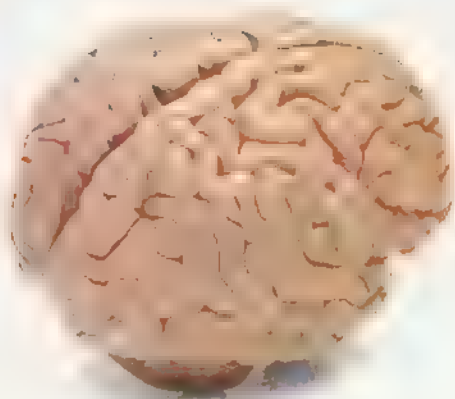
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ADK RATS RATS

ADK RATS RATS

Our new software

makes the most of yours.



By any standards, the Activision Designer's Pencil is a unique piece of software. With it, you can design, draw, plan.

You can draw the world and everything that's in it.

And then set it to music.

You can produce complex designs in no less than sixteen different colours.

You can write and develop your own programs, without having to understand Basic.

You can do all this with a joystick.

But then you've only scratched the surface.

As you use the Pencil, it will reveal the full potential of your computer, in the most entertaining way possible.

£11.99 might be a lot to pay for a pencil.

But not this one.

When you've done zapping the world, rebuild it with the Designer's Pencil.

Its scope is as broad as your own mind.

 **ACTIVISION**
Your computer was made for us.

£11.99 Commodore 64, £9.99 Sinclair Spectrum. Available soon for all popular systems.

FROM SELECTED BRANCHES OF BOOTS, JOHN MENZIES, AND GOOD COMPUTER SOFTWARE STORES EVERYWHERE.

Are you only using

To only play games on a Commodore

computer is like asking Albert Einstein to work out

the square root of four

The computer's brain barely ticks over

To really stretch it, you need more interesting

software programs. For example, record keeping,

interactive education, stimulating adventure games

or word processing.

And for those you need peripherals.

Like a Commodore disk drive, a really fast

storage and retrieval system with a vast memory.

Or a Commodore cassette unit, the

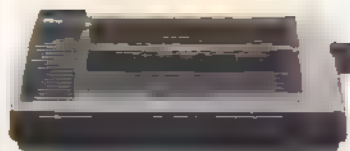
inexpensive way of loading and storing programs.

For those who like the idea of text and graphics

being more alive and having greater clarity than

on a TV, there's the Commodore colour monitor.





COMMODORE MPS801 £121
Dot matrix printer £230.00
Tractor feed. Print speed:
50 characters per second



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Dot matrix printer £245.00
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paper. Print speed:
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Daisy wheel printer £189.95
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Printer/plotter £119.95. For
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Details in our Commodore brochure

1/10th of your brain?

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Finally, for more exciting games, there are joysticks and paddles.

So use your brain. And make sure you use all of your computer's brain.

FOR FURTHER INFORMATION TICK 1111 FOR MORE OF THE BOXES ABOVE AND
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commodore

Lunar Module

Your chance to make that giant leap for mankind on the Dragon 32 by Ashley Watson

Program Notes

Lives

10 - 210

1000 - 1120

2000 - 2080

3000 - 3100

4000 - 4080

5000 - 5140

Initialise

Main loop

Check keyboard

Calculate

Delay

Crash/land routines

6000 - 6150

6150 - 6230

7000 - 7040

8000 - 8130

8900 - 8960

9000 - 9300

9310 - 9390

Display instruments

Print space ship

Draw landscape

Instructions

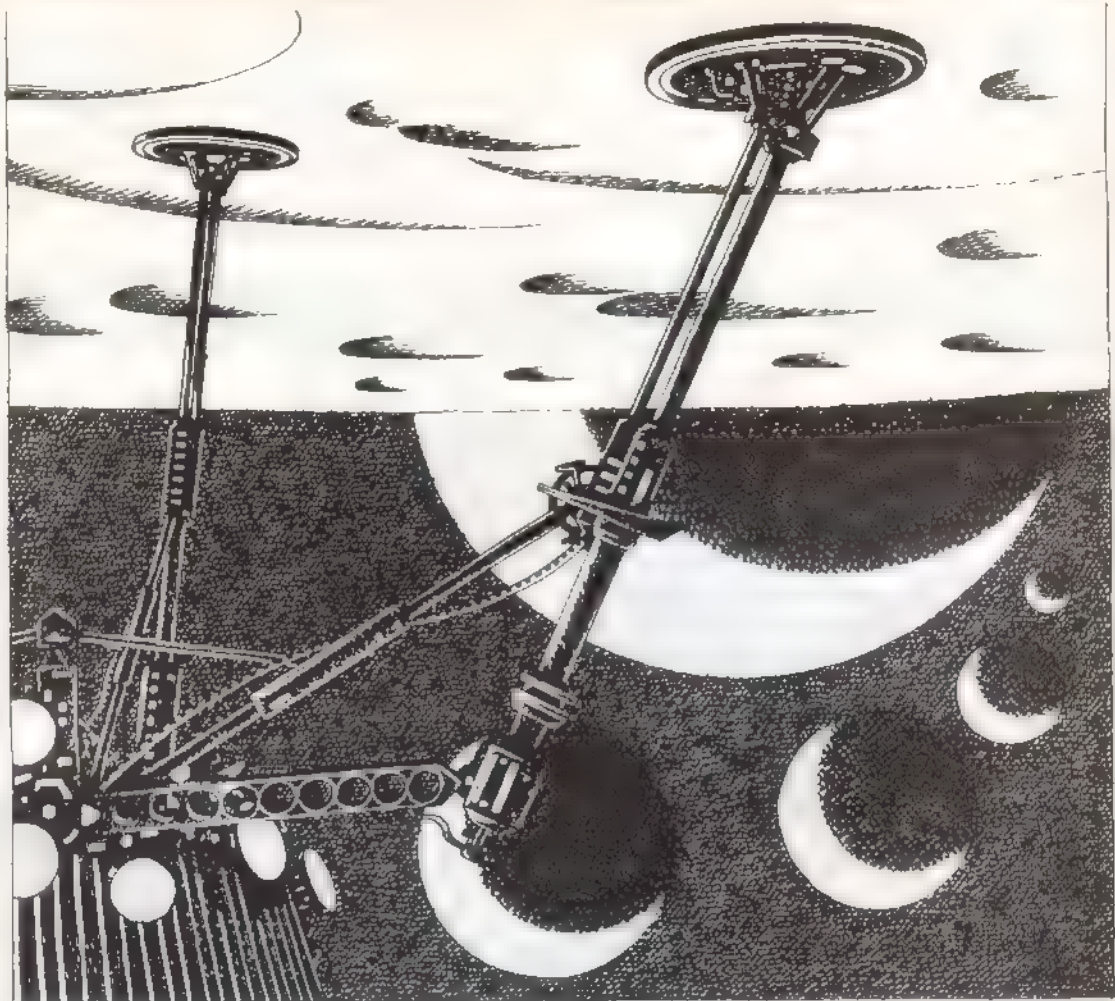
Another go?

Used to set up display

Data for letters, numbers and

machine code

This program simulates the landing of a lunar module on the surface of a planet. The speed at which the craft falls, etc, is quite accurate because a number of equations are used — Lines 3030 to 3090 — which calculate fuel used, fuel left, mass of module, velocity and height above the planet's surface. On a successful landing, the speed at which the landing took place will be shown. Full instructions are shown within the Dragon



THE FOLLOWING IS A SCREEN DUMP OF THE PROGRAM

@



200
180
160
140
120
100
80
60

```

10 REM
20 REM initialise
30 REM
40 CLEAR 100,32700
50 DIM M$(16),NU$(10),R$(10),R1(10),
  R2(10),R3(10)
60 FOR A=1 TO 26:READ M$(A):NEXT
70 FOR A=1 TO 10:READ NU$(A):NEXT
80 PCLS:FOR A=0 TO 10:READ DA:POKE1536+
  (A*32),DA:NEXT
90 FOR A=0 TO 10:READ DA:POKE1536+(A*32),
  DA:NEXT
100 FOR A=32701 TO 32738:READ B:POKEA,
  B:NEXT
110 G=(16,0)-(24,8),R2,G
120 G=(10,0)-(10,10),R1,G
130 G=(100,100)-(108,110),R1,G
140 G=(100,100)-(108,108),R3,G
150 GOSUB 8000:GOSUB 9000
160 V1=100
170 H1=1000:H1=H1
180 F1=500
190 M1=2500
200 NU$="LB0TB0V31AV25RV20CV15D"
210 CR$="(U)125AL255BAG"
1000 REM
1010 REM main loop
1020 REM
1030 GOSUB 8000
1040 GOSUB 2000
1050 IF H1<1 THEN 5000
1060 GOSUB 3000
1065 IF H1>1000 THEN CLS:PRINT " THE
  PLANET IS NOW OUT OF RANGE
  DUE TO OVER THRUSTING.
  MISSION FAILED":GOTO 8500
1070 GOSUB 4000
1080 IF H2=200 AND H1<200 THEN F4=1
  ELSE F4=0
1090 IF H3=200 AND H1>200 THEN F5=1
  ELSE F5=0
1100 IF F5=1 THEN C=1000:GOSUB 9210
1110 IF F4=1 THEN C=100:GOSUB 9210:GOSUB 7
1120 GOTO 1030
2000 REM
2010 REM check keyboard
2020 REM
2030 AF=INKEY:IF AF="" THEN 2070
2040 J=ASC(AF)
2050 IF J=48 OR J=53 GOTO 2070
2060 K=J-48:GOTO 2080
2070 F=0
2080 IF F2>0 THEN F=F*10000 ELSE F=0:F=0
2090 RETURN
3000 REM
3010 REM calculate
3020 REM
3030 V=V1:H=H1:F2=F1:M=M1
3040 A=(F/M)
3050 V1=V-A
3060 H1=H-V
3070 U=(F/50000)+50
3080 F1=F2-U
3090 M1=M-U
3100 RETURN
4000 REM
4010 REM delay / print thruster
4020 REM
4030 IF K<0 THEN PLAY MUS:F1=E6+2:FM=
  E6+10:PUT(128,FL)-(136,FM),R2,(PSE)
  ELSE FL=
  0:FM=0
4040 FOR B=1 TO 300:NEXT B
4050 RETURN
5000 REM
5010 REM crash or land
5020 REM
5030 IF V1<5 THEN 5100
5040 REM
5050 REM crash routine
5060 REM
5070 FOR Q1=1 TO 13:CIRCLE(150,175),0:
  PLAY CR$:NEXT Q1
5080 FOR Q3=13 TO 1 STEP -1:CIRCLE(150,
  175),Q3,0:PLAY CR$:NEXT Q3
5085 CLS:PRINT "YOU CRASHED AT A SPEED OF ";Z

```

continued on page 20

At £129, LOOK HOW THE ATARI 800XL LICKS THE COMPETITION.


At last, serious home computers are up against serious competition. The ATARI 800XL

offers everything other competitors in their price range offer. And, as you can see above, ■ great deal more.

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REAL KEYBOARD	+	+	+	+
	SINCLAIR SPECTRUM PLUS	ACORN ELECTRON	COMMODORE 64	ATARI 800XL


```

5086 PRINT "METRES PER SECOND"
5090 GOTO 8500
5100 REM
5110 REM land routine
5120 REM
5130 CLS:PRINT "YOU LANDED AT
A SPEED OF";Z
5132 IF Z<0 THEN Z=1
5135 PRINT "METRES PER SECOND"
5140 DATA 8500
5150 REM
5160 REM
5170 REM
5180 REM update fuel/height level
5190 REM
5200 REM
5210 X=X/5.6:Y=Y/12
5220 LINE (39,170)-(39,81):PSET
5230 LINE (20,170)-(20,81):PSET
5240 LINE (120,170)-(120,X):PSET
5250 LINE (139,170)-(139,170-Y):PSET
5260 REM
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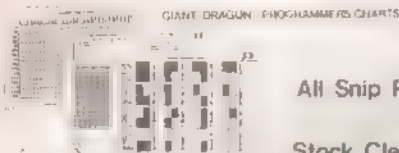


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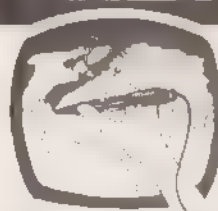
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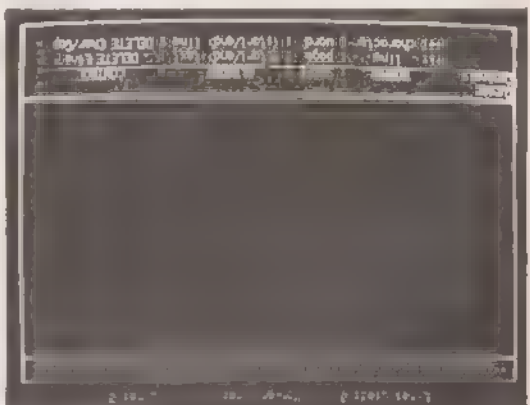
Program QL Machine-Code Editor/Assembler Micro QL software arm of McGraw-Hill Book Company, Maidenhead, Berkshire.

This is a product from the software arm of McGraw-Hill, and is advertised along with their QL machine-code book. It consists of two separate programs — a screen editor, and the 68000 assembler. The editor is actually written in SuperBasic, which has its advantages and disadvantages. It is easy to write and debug, but the disadvantage is the complete lack of crash-proofed speed, as it is not really toned speed, as it is not really noticeably slow — in fact, it is still faster than Egon's Cull.

The problem occurs when you rather necessary using files of its non-standard syntax, is replace option which, because does not have a search and has a (slow) search facility. The rest of features, and though it doesn't mention what to do after it crashes out — which it did quite often. After contacting the authors, they came back to me with a *GoTo* command that would re-start it. The editor itself has the *ba-* save or load a file — if any error occurs, such as not finding the file, the program bombs out with an error message. My preliminary instructions didn't mention what to do after it crashes out — which it did quite often. After contacting the authors, they came back to me with a *GoTo* command that would re-start it. The editor itself has the *ba-* save or load a file — if any error occurs, such as not finding the file, the program bombs out with an error message.

entered a program and saved it, it would be useful to have an option in the editor to load the assembler.

The assembler is unusually written in machine-code and runs as a proper job, so would run concurrently with the editor if it didn't insist on *Memory* itself. It asks for three filenames, for the source, the object code, and the listing, then gets on with it. It is fast, with none of the overlaying problems I experienced for example on the Metacomco assembler. The assembler itself is almost a Motorola standard — it doesn't need the *Quick or Ad-* dress operands in its instructions, and adds them itself, but strangely rejects any instructions that actually specify them. It also has a non-standard way of doing data, using 28000 mnemonic instead of 68000, and always requires colons after its symbols for some strange reason.



The editor is OK, but, as was converted to machine-code easily tripping it would be

The assembler is non-standards, as is Metacomco's. Compared with Metacomco's, it's a case of takes your money, you get very crowded — I have just got the official Sinclair one, and two others are also imminent. With all these assemblers available for the QL, why doesn't some other software come out for it? Andrew Pennell

Landlubber

Program Yacht Race Price £9.95 Micro Spectrum 48k Supplier Hill MacGibbon 92 Fleet St, London EC4Y 1DH.

With light simulators reaching greater and greater sophistication where do you go next? How about a yacht simulator? It certainly strikes a note of originality amongst the usual churning out of programs. Hill MacGibbon have given their range the title 'Games that stretch the mind' and it is in the area of education that I give this highest marks. For a confined landlubber like me, it's a real pleasure to develop an easy familiarity with terms like tacking and gybing and to be honest there's a much greater chance that such gains will be put to practical use in a real boat than the hours of practice put in on *Flight Pilot* ever will. How accurate a representation of the behaviour of a real

Insight

Program Henry IV Part I Micro Commodore Price £7.95 Supplier Penguin Books, Harmondsworth, Middle

Educational software needs to be treated with some caution. I often have the feeling that you would be better off spending your money on a good textbook. The program works like a small database system containing references to a number of key characters and topics relevant to the play, eg Falstaff, Hal, Henry, loyalty, kingship. You select the character or topic of interest to you using an easy-to-use search menu, and the program will then present you with a series of references to the chosen subject. You select more than one subject.

Tony Kandle

The program gives you only the references which link all the names or concepts selected. Each reference gives you the Act, Scene and Line in the play so that you can refer to original text, and it also provides a paragraph of comment which points out the particular significance in the play of this reference. The comments not



This is a well designed educational package where the computer is used to provide input and give insight in a way which could not easily be achieved using a book of the play on its own. It should form a useful addition to the study of this play. Richard Corfield

yacht this is, I am truly not qualified to say, however, the presentation is laudless with, as would be expected from a publishing company, excellent supporting documentation and maps. Unfortunately, this is accompanied by a pretty excessive price tag. They have also thoughtfully provided a save to

The game itself is well programmed by Five Ways Software, but is let down slightly by the graphics. Doubtless they accurately reflect the speed of the graphics. Doubtless they certainly strikes a note of originality amongst the usual churning out of programs. Hill MacGibbon have given their range the title 'Games that stretch the mind' and it is in the area of education that I give this highest marks. For a confined landlubber like me, it's a real pleasure to develop an easy familiarity with terms like tacking and gybing and to be honest there's a much greater chance that such gains will be put to practical use in a real boat than the hours of practice put in on *Flight Pilot* ever will. How accurate a representation of the behaviour of a real

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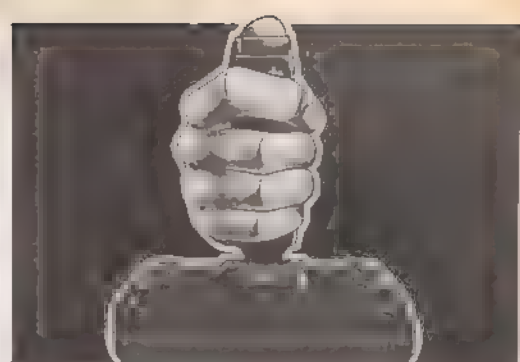


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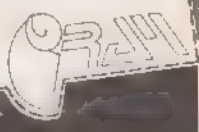
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Sounds good

Program Se-Ka of Assist
Price £2.99 Micro Spectrum
48K Supplier Master Vision,
Park Lane, 11 Park Road,
London NW8 7JL

There's also far better use of sound than in most adventures (fall off a path and see what I mean).

What is lacking is content. With a good number of rooms, all made up of the same elements, a sense of repetition soon sets in. There are too



MasterVision is Master-
tronic's up-market
label, and my copy of
Se-Ka came in a video case

with an accompanying booklet. It's an adventure with illustration

or rather it's a mainly illustrated adventure, in two parts.

The first is a find various sacred objects in the Castle of the Dead, which is haunted by the Dark Hordes. These ob-

jects then have to be returned in a week which has produced many good new adventures.

In a week which has produced many good new adventures, this one is in some ways, a picture book without a story.

Obviously for the price it's no rip off and is certainly worth a look if you're an absolute ad-

dict.

Get your kicks

Program Smash and Grab Mr.
Price £1.95 Sup-
plier Superior Software, Regent House, Skinner Lane, Leeds

ever fancied robbing a bank with the know-

ledge you have three chances of getting away with millions of pounds? Well, here

you may have three chances of getting away with millions of pounds? Well, here

police are also floating dustbin lids and flying police-cones to command with

To explain first you kick a

police-cone through a bank

window. This releases bags of gold which then cascade down the screen. Your job is to run up

platforms collecting the bags of gold.

A lot of kicking is encouraged in this game. You aim a sharp boot at a flashing police

box (one of the old Tardis-shaped sort) the traffic lights for some reason change to red

and this gives you the chance, just by touching him, of knocking the poor bobby into

the water. In short, a reprehensible little game — I liked it.

Fred Short

Cat-napping

Program Show Crazy Price
£5.95 Micro Spectrum 48K
Supplier Soft, 293 Manchester
Road, West Thimbleby, Altrincham, Cheshire WA 14 5NB.

Lost — Ginger Cat —
Answer to the name of

Partridge Pest — Reward. I can't think of any other

quests to find lost moggies, but that's the theme of this adventure and it makes a pleasant

change that the worst that can happen to you are fractures.

Obviously, to add a sense of urgency to the cat hunting, case it's the impending show.

Harping on

Program Jack and the Beans-
Supplier Superior Software,
Dept C, Regent House, Skinner Lane, Leeds

The fairytale of Jack and

magic beans is the basis for Andrew Harley's latest game for Andrew Harley's

game — but a first-rate variation on the theme.

You control (from the keyboard only) Jack's movements

which are fast and well animated. Climbing the beanstalk is

grabbing golden eggs and not as easy as it looks —

been an inspiration?) and

have been an inspiration?) and

have been an inspiration?) and

have been an inspiration?) and

have been an inspiration?) and

have been an inspiration?) and

Hints as to where the elusive

fact has been abundant, adding to your frustration, and

even when he's found and captured you still have to get

him. The show rather obviously *Quill-ed* el-

sort, despite the addition of some primitive graphics

While experienced adventurers will romp through it, it

should suit the less experienced player.

Its novel subject and light tone make it highly playable

and while it is a little overpriced it should provide a wel-

come change

John Minson

above all...the Giant's bags of

gold. As per the original story,

uses you very rapidly indeed.

Dodging is extremely hard and

skin down the beanstalk is to

grab an axe — cut off his

descend. A fresh beanstalk will

grow — for you try for more.

There are an assortment of

other dangers — dodge while

this all goes on. Smoke blowing

from the cabin chimney may

talk. Snails attack you in the

though, you can dig holes to kill

off the snails and slow down the

big himself.

It may not be the most novel

of programs but it is actually

quite a fine game.

Dave and Jan Watkinson

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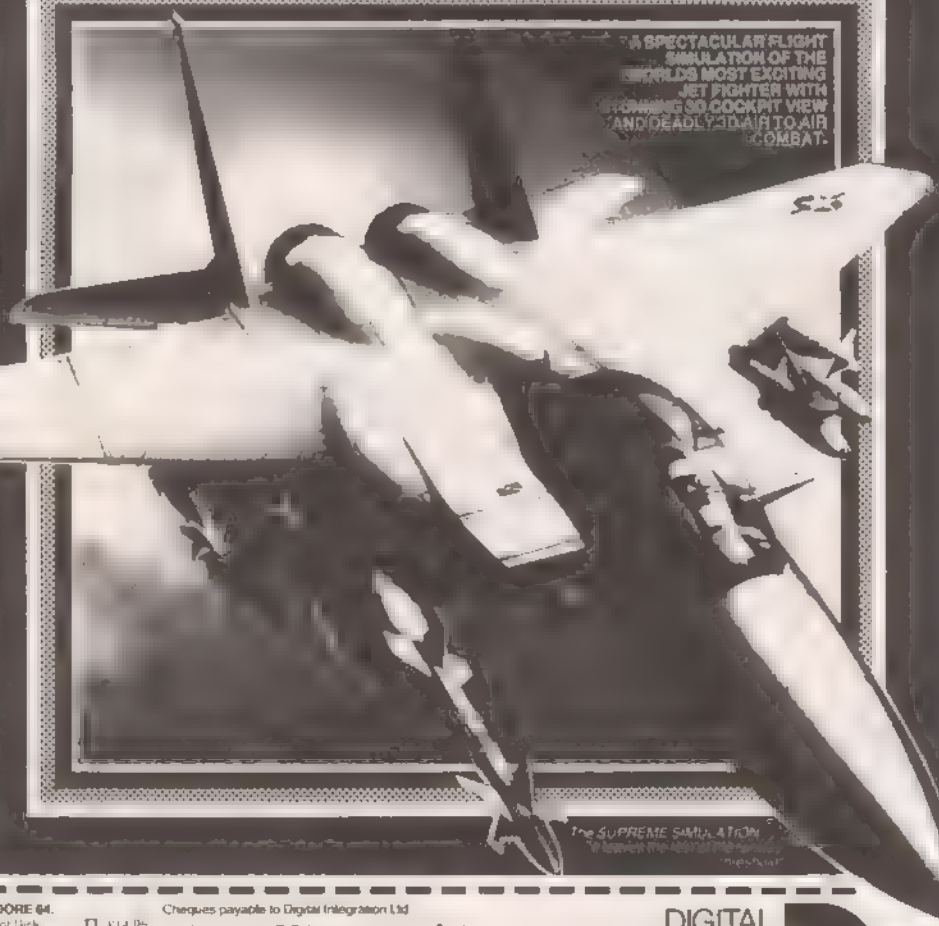
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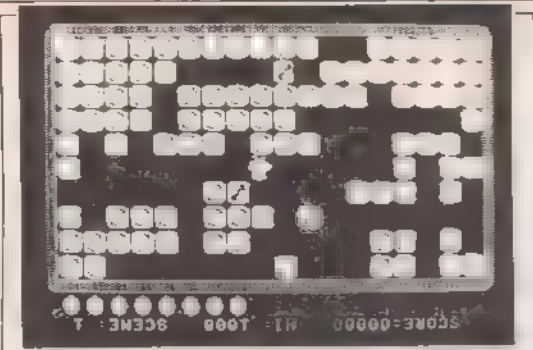
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Richard Corfield

Verdage: Unfortunately for Percy, there are some deadly Sno-Boes in a maze full of ice cubes. The only way he can survive is to avoid contact with the Sno-Boes, and to crush them when he gets the chance by throwing some of the ice cubes at them. If he disposes of all of them, another level opens and he has to start all over again.

The game lacks any really striking features to distinguish it from many other similar games — often with better graphics, greater variety, more features, or just more of a challenge.

Frozen

red, making the now look very



Fred Short

As usual, your task is not easy — involving climbing up a series of ropes or vines placed in the correct order. Getting in your way are creepy called snappers, and dark called birds . . . whatever they are. I always thought the atmosphere was related to the big finaly . . . which seem to contribute and down the vines in an erratic manner as though they know just what your next move

Each game opens with Larry Kong being watched in his cage — the top of the screen, accompanied by appropriate music which plays throughout

Erratic

The theme has been subtly changed ■ ■ ■ avoid the woman-in-peril scenarios and this version has pool Zany Kong kidnapped by the evil Moris. You must collect the keys and release him from the lion-barred cage which holds him prisoner at the top corner of the screen.

Program King Junior ML-
Superior Election Price \$7.95 Sup-
 Superior Software, Ka-
 gent House, Skinner Lane,
 Leeds

Erratic

Erratic

There are three games ■ de completed. Pegs have to be placed on one side of ■ line in positions that mirror those already on screen, after which a mirror image has to be constructed. Finally recourse to be given to the child for the second he or she is strictly on his or her own — even adults will find this tricky. Finally a score, plus high score, are displayed.

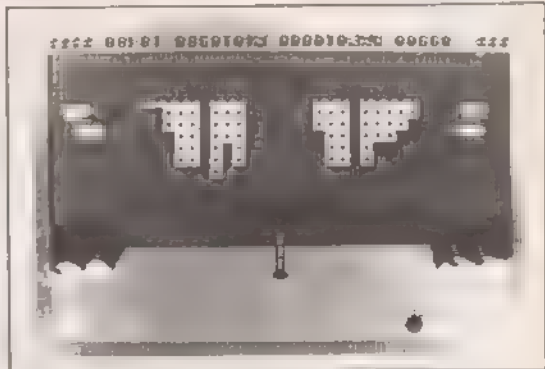
Four different types ■ multi-are available — diagonal Three speeds are also available, giving a longer or shorter table, giving a longer or shorter

continued on page 12



Richard Corfield

by persistent catastrophes. I eventually became frustrated after my new building had been repeatedly demolished. I would have liked it up more dramatic for the disaster-prone country and something proved to be rather disappointing. The graphics and sound proved to be quite different which surprised me.



Demolish

most of the damage, for example, all narrow buildings are partially prone to collapse in an earthquake. Fortunately, you get a few seconds warning of an impending disaster so you can place a few more blocks to minimize the damage. You score points for each block and each new story in the building, but you lose again when the building is damaged. The basic idea is quite simple, but it makes an unusual concept for a game. Something

Program Castaways Micro
Commodore 64 Price £6.95
Supplier Mirrorsoft, Holborn
Circus, London EC1

Shattered

The building blocks are fer-
red in by boat, and you have to
arrange them into place by hand-
copier. This aspect of the game
is not particularly difficult. How-
ever, the natural disasters occur
amazingly often, and are always par-
ticularly devastating. Each type of catas-
trophe causes a characteristic

build a skyscraper on a tiny island in an area wracked by earthquakes, hurricanes, light-

Program MacMan's magic
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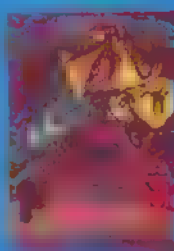
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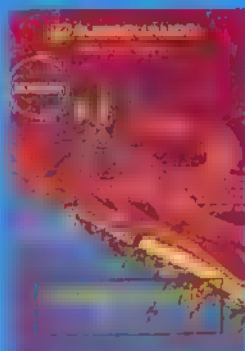
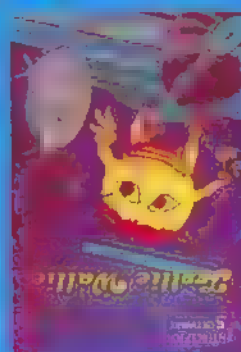
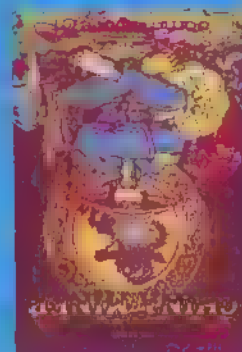
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The production of these sounds effects without the constant attention of the processor is now possible thanks to the AY Sound Chip, its flexibility makes it essential for a wide range of applications including music synthesis and sound effects generation, continuing the monitoring and production of sound after the initial command. More often than not realistic sounds require more than one effect and this function is provided by 3 independently controlled channels, as an example, compare the sound produced by the single note of C, with that produced by the chord 'C' and you will know just what I mean, likewise producing the sound of an explosion using all 3 channels gives games a totally new dimension.

Add to this the ability to alter the pitch tone and shape of the sound you have produced and it's flexibility is unlimited. In simple terms, imagine the note you have produced as a calm sea, by altering the pitch and shape you can produce waves, the top of the wave corresponds with the maximum volume and pitch of the note, which like the wave itself rises and falls.

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Beethoven to Bowie - Starwars to Splats.

The screen display shows all functions. Simply move the cursor along the keyboard, select the desired note by pressing the fire button and the note selected then appears on the screen.

You can vary the tempo/volume and when 'played' the notes simultaneously scroll across the screen. 10 Envelope controls mean that once created, tunes and sounds can be subtly altered given varying attack and decay times to create futuristic music and sound effects. You can record and save up to three different tunes and amend each one as necessary. The dk'tronics Sound Synthesizer is suitable for both Spectrum and Spectrum + models and is guaranteed to give you hours of fun and would make an ideal Christmas gift, you never know you might turn to be another Stevie Wonder.

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Advanced

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disc **Supplier** Impex Designs,
Metro House, Second Way,
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Modems and the development of phone-in systems seem to be getting a good deal of attention these days. The speeding up of the British Telecom acceptance procedures for modems and the increasing interest of large companies such as Commodore and ICL in the commercial potential of phone-based communications are helping to generate interest. However, we are still somewhat behind the USA in this field and many of the new systems appearing in the UK now are based on American experience.

The VIP Terminal software, developed in Minneapolis, is a good example of the level of sophistication which can be achieved. The package gives nearly all the facilities required to fully exploit phone communications. Nine major functions allow you to set up a wide



range of options: a help facility, a screen display setup, a telephone directory, the communication mode itself, a facility to pre-program short messages on to certain keys a real-time clock with alarm, disc management and file editing, and a printer-driver routine.

The display can be modified to show 40, 64, 80 or 106 columns of text, in any colour. Of course a monitor is suggested for the highest resolution. Automatic wordwrap can be switched on, and audible margin-warnings can be requested.

The terminal handles baud rates from 50 to 2400, including

split rate 1200/75, assuming that your modem is as versatile. The software gives you full control of such things as parity, stop-bits, duplex, linefeeds, pause characters, the sending of special characters, and so on. All those things which may change from system to system and can cause major problems for the inexperienced or non-technical user, such as myself. It is possible to call for help or modify these settings whilst in the communications mode.

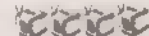
The phone directory lets you keep phone numbers, settings for different systems (such as baud rate), and log-on messages. If you have a suitable

modem you can even get the software to auto-dial and log on for you. Unfortunately this is where the American software is of limited use. Commodore have released a number of modems in the States which are driven by this software, but many modems sold in the UK do not use the same method for auto-dialling.

The disc commands let you set up files on disc, modify files, send stored files through the modem, and receive and store files. Non-Commodore printers as well as the various types of Commodore printer are allowed for to produce a hard-copy of your communications.

The VIP Terminal is a very advanced package, giving facilities and a level of control usually reserved for business micros. The cost takes the software out of the games-software league, and deservedly so. A pity that the auto-dial may only be used by some, although most modems (thanks to BT) do not support this facility in any case. Incidentally the software cannot be used to drive the Compuserve modem, nor can it be used to give full access to Compuserve.

John Cochrane



Deuce

Program Match Point **Price** £7.95 **Micro** Commodore
Supplier Psion Limited, 1 Dorset Square, London NW1

How about this for a last-minute contender for the Christmas No 1 slot? Psion -- better known for its Sinclair titles -- has produced its first ever program for the

Commodore 64, a conversion of its excellent Spectrum release *Match Point*, the tennis simulation which beat all tennis simulations.

So many Spectrum to Commodore conversions turn out to be disappointing *Match Point* is a welcome exception. It modes well right from the speedy loading, followed by the title screen depicting a hunky specimen of the tennis fraternity.

As you might expect, the

graphics are bolder, even more life-like than the original, as the players skedaddle round the court on little legs at a great rate.

Choose from three speeds of play according to ability and how much you want to trash the computer at its own game. The quarter final's speed is good for starting off with to enable you to work out how best to play the shots. Semi-final pace gives a good playable game, while the finals will soon have you reaching for the sweatband and umpire's refreshments yourself.

Almost as much fun as playing is watching two players battle it out in demo mode -- no tantrums over dubious line calls here, and the Commodore crowd are a passive lot too -- they don't turn their heads to follow the ball as they did on the Spectrum.

Three final points worth mentioning: the game is joystick controlled only, the blurb on the inlay says about a

match and return to the main menu press F1, whereas on my copy F2 did the trick, and if you press the space bar while serving, you can watch the receiver fiddle about on the baseline. Just like real life.

Christina Erskine

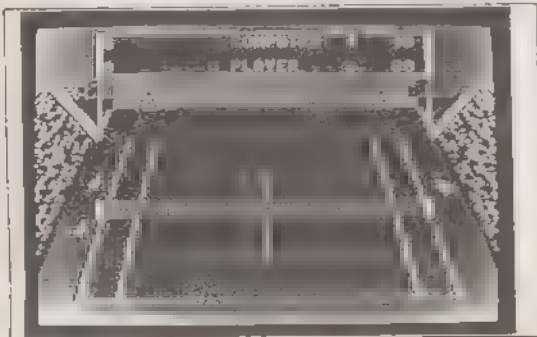
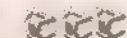


time to complete each task.

Given this element of competition it seems unfair not to be display either score or time counting down. I think most children will feel cheated to suddenly find that the mirror 'shatters' because time has expired. And the use of the cursor keys is bad for little hands -- why not user-definable ones?

Given these rather major reservations, the game should serve its purpose providing there is suitable parental supervision, something the booklet emphasises.

John Minson



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"Some were named after daughters of the floor workers."

The final operation to take place in the body construction area is quality control. Before leaving in an elevator for the first floor to have the doors and boot lids fitted, the underbody is placed on a large pressure sensitive 'bed'. Electronic sensors connected to a Hewlett-Packard computer check the position of each specific component. The charts produced from the computer immediately show if anything has been finished incorrectly — even a millimetre out of alignment can be detected.



Dave Hutchinson

The robots do not stop here with the assembly of the main body — the paintshop — also now fully automated too.

First the entire body frames are cleaned, degreased, electro-coated to prevent corrosion — sealed at the joints, and cleaned again, to remove any lingering dirt or dust. Surprisingly, here the final cleaning is done using ostrich feathers. Robot ostriches? Apparently not.

Ostrich feathers are expensive, but last about a year before they need replacing. Their electrostatic properties make them the best for the job — far better than the plastic strips used in an automatic car wash.

The robots are allowed the last word though — they apply each of the seven coats of paint applied to the Sierra models.

The Sierra assembly line in the Dagenham plant is the most technologically advanced in the country. The cost of all the robots now installed on the line amounts to some £250m.

"We went by the robot route to save on constant labour costs and become more efficient," said Dave. "Obviously though we still need the staff to supervise and maintain the robots."

The question of how the robots have taken over from manpower is inevitably a touchy one. In the 1970s — pre-robot days — there were about 50 people working on side-frame assembly alone. Today that number has been whittled down to a fifth. And robots don't have salaries and paid holidays.

Ford maintains that such automation has had to be introduced in order for the company to remain competitive.

frame is constructed.

With the underbody, Kuka robots are again used for spot welding. "These are what we call hard automation robots, because they can't be reprogrammed," said Dave.

"The Kukas you saw on the side assembly are all reprogrammable — you can alter the speed at which they work, the number of spot welds they make, and so on. A separate hand-controlled unit can be plugged in, and the new motions gone through, physically, using the unit. Then you press a button, and the movements are stored in the robot's memory. The new programs are generally stored on tape and two back-up copies made.

"However, the underbody construction is all done with hard automation — the main panel is loaded in at the start, the rear and front floors and engine compartment are then spot welded on to complete the assembly. An electronic signal is also sent to the underbody assembly section to determine whether the components are to be set up for a left-hand or right-hand drive car.

"Automatic transfer devices, similar to the Niko 'hand' pick up the completed underbody — the part we call the 'marriage' — and bring it together with the side frames for the main body-frame assembly.

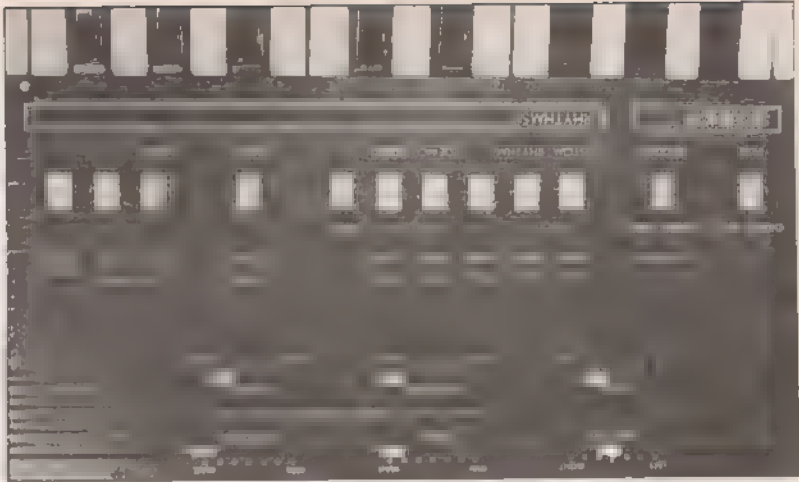
"The main body-frame assembly is still done by hand," admitted Dave. "We simply haven't found a better way yet. The staff on this line use simple clips to attach the roof panels, each side panel and the underbodies together."

Next the assembled Sierra bodies begin their trip down the long line of bulky Cincinnati robots to finally weld the frames together.

The 24 Cincinnati robots which finish off the welding are the most powerful. Standing about six feet high their precise movement is controlled by computer-operated hydraulic pistons and activators — rather than by electric motors. Whereas the spot-welding and clipping, up till now, has only involved the minimum number of connectors and robot movements to hold the frames together at this section of the line, the Cincinnati giants provide the main strength welding finish.

They were among the first robots to be used by Ford and are the only ones at Dagenham to have been given names — two are called Sarah and Anne and those on the second line are called after football teams — West Ham, Arsenal and Fulham.

Intrigued, I had to ask. "It was one way of making the robots seem less threatening when they were installed," Dave explained.



Hardware Review

Performing SIEL

Hardware SIEL MK900 Price £499 (Midi interface £99, Software £30 approx)
Supplier SIEL UK, Alfred Depot, Reigate Road, Hookwood, Horley, Surrey.

Much has been said of Midi recently. What began as a long overdue standard for musicians, enabling them to connect together instruments from different manufacturers, looks like being the spark which ignites a whole new area of computer music development.

The problem for computer owners is, that so far the jump into Midi has simply been too expensive, whatever their interest in music. Until recently the cheapest Midi equipped keyboard has been £700 at least.

However, the new SIEL MK900 is a Midi keyboard for just over £400 — not much more than a good printer. It's a big step on the way to the time when a synthesiser is as common a peripheral as a joystick or light pen.

A synthesiser can give the current crop of computer musical possibilities they could never otherwise possess. Not only ergonomically — you can't play a Qwerty keyboard with any finesse — but also in terms of the quality and range of sounds available.

The synthesiser on the market now are capable of such perfect mimicry of acoustic instruments that it's often difficult to tell the difference. Sound chips on available computers are capable of only three or, at best, four channels of sound. The last point means, basically, that you cannot even play simple chords.

But whilst all this is a pro-synthesiser argument, why involve the computer at all? Why not just buy the instrument? Time to look at the other side of the coin.

Casio and other manufacturers of cheap musical keyboards have spent much time, effort and money making those instruments as easy to play as possible. Casio and co.

know that the real money is not made from professional musicians but rather from dabblers, amateurs who know a little music but want to learn more and who want to be able to crack out a few tunes at parties.

Casio tried many different techniques to help people learn music: some of their instruments had little lights — leads — that lit up above each note on the keyboard as the notes were stored in its memory was played — the idea being that you would try to follow the lights and thereby learn the tune. Other features, like one-note chords and auto bass lines gave an automatic, if rather plastic, accompaniment to your single line.

Using computer programs to learn about music will always be more successful than flashing leads or instant chords (unless — too often — the case until recently) because it requires your response and control with a computer in absolute terms. You get more flexibility in the sense that you can cover those areas you are most doubtful about in greater detail and at greater length. Equally it becomes harder for you to cheat — the computer can ensure that you understand some musical point before allowing you to continue.

For musicians linking a computer to a MIDI keyboard allows a freedom similar to that provided by wordprocessors to writers and typists previously accustomed to typewriters. Software packages can (and, in at least one case, do) allow for multi-part compositions with instant playback of one or all parts. Sections of music can be rearranged, moved about, assigned to different instruments, as easy as possible.

Sections of music can be rearranged, moved about, assigned to different instruments, as easy as possible.

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ment sounds and so on. There are two ways of looking at the SIEL MK900: as an instrument in its own right and as a computer controlled Midi keyboard.

Thus being a computer magazine, we'll zoom through the former and look at the latter in more detail.

What you get for £499 is a five octave full size keyboard with ten preset sounds, ten rhythms, a sequencer which can remember 50 chords and 280 notes and various autoaccompaniment features.

A feature which enables two presets to be played at once on the same note makes even the basic sounds pretty impressive. Even the farnest, the Piano preset, as is often the case, can be improved by sustain and define features.

The rhythm section is good. Digital sounds (it is way above the thin chords and clicks usually associated with built-in drum units). There is also the facility to create your own rhythms guided by a metronome pulse — very effective and useful.

Any of the features may be recorded into the sequencer and will loop could endles-ly to provide a simple backing for solos. All in all, it is the elder brother to all those little Casio keyboards, incorporating many of the same features, a few of the limitations, but mostly having much more impressive sounds and rhythms.

But the MK900 has Midi and as such can be linked to a home computer via SIEL's Midi interface unit (£99) and controlled by computer software. — present there are two packages for the Commodore and one for the Spectrum. A BBC Midi interface is due as is some BBC software.

I looked particularly at SIEL's two packages for the Commodore — the Midi *Multitrack Composer* and the *Live Sequencer*. The *Composer* is some way towards the on-screen musical score but uses musical notation which is clearly intended for musicians. In other words you don't get staves, crochets and quavers. Instead,

for computer novices rather than experienced musicians. In other words you don't get staves, crochets and quavers. Instead,



notes are notated with their letter and a number to indicate which octave you require, eg, C4 equals C in the fourth octave. The = and the ■ sign are used to indicate sharp and flat respectively. Note length is expressed as fractions of 96, so a quarter note has a duration of 96/4, ie, ■.

Tunes are created on one ■ six tracks (like a single line of monophonic, ie, single note music) which are then assigned to Midi channels. More than one track may be assigned ■ each Midi channel and in this way chords may be created using combined single tracks together.

Individual notes may be made staccato or legato by adjusting the 'gate on time' figure — basically slightly adjusting this figure makes the note a little longer or shorter without affecting the 'clock'.

Each track of music may be edited — notes may be removed, added, note lengths changed and so on, tracks may be saved to disc, loaded in, renamed or erased under your command. What does this mean in terms of the MK900?

The keyboard has two Midi channels: ■ and 1. This means that it can have two 'streams of information' operating independently at the same time. If that sounds confusing it isn't, since in practice two Midi channels means that at any given moment two sounds may be used and within each sound the six tracks may be allotted. For example, by assigning tracks one to four to Midi: 0 and tracks 5 and 6 to Midi: 1 you have set up an arrangement whereby one sound (say, organ) can play chords, up to four notes and the other sound (say, synth) can play up to two notes on ■ lead line. I should add that whilst the computer is playing the keyboard you can still join ■, using the same sounds.

On the Commodore you are provided with a total of 9000 notes to play around with, 1533 over the six channels, enough for anything short ■ *The Ring Cycle*. The C4, E3 =, D5 notation is obviously pretty irksome to tap into the keyboard but if, like me, your musical compositions don't get much beyond three note chords and one

note lead lines it shouldn't be too much of a problem.

The live sequencer is, in a way, the Composer from the other end. Here you set up the program to receive information and play the keyboard. The border flashes as each note is 'received' by the computer, although all that is recorded is the note information, not the particular tone you have set — you can change that as you wish.

The recorded notes are assigned to a given track and may be played back through the keyboard at a faster or slower speed. New tracks may be recorded and also played back — the effect is very much like having a multi-channel tape recorder with extensive over-dub facilities.

Obviously entering the music with the keyboard is much more convenient than typing in the notes on the Commodore but then you don't get the same degree of editing flexibility. You pay your money etc, etc. The MK900 is a high quality top-of-the-range portable with enough features and quality sounds to get music that doesn't sound bad with only a little effort. Add a Midi interface and you have, with the right software, an instrument on which you can compose multi-part music, create and replay many lines of melody and generally tinker to your heart's content.

The MK900 lacks two things; firstly ■ has presets and thus the sound creation ■ limited and secondly the Midi standard allows for the communication ■ velocity (how hard you hit the keyboard) but the MK900 is not a velocity sensitive keyboard. In this sense, buying the MK900 ■ not letting you use all the Midi features possible.

For my money the MK900 is the ideal instrument for those who want a starting point with computer music but aren't too worried about limited sounds and don't want to risk too much money. The auto features are particularly useful and with the software packages that will surely come, sophisticated and impressive arrangements can be created.

Graham Taylor



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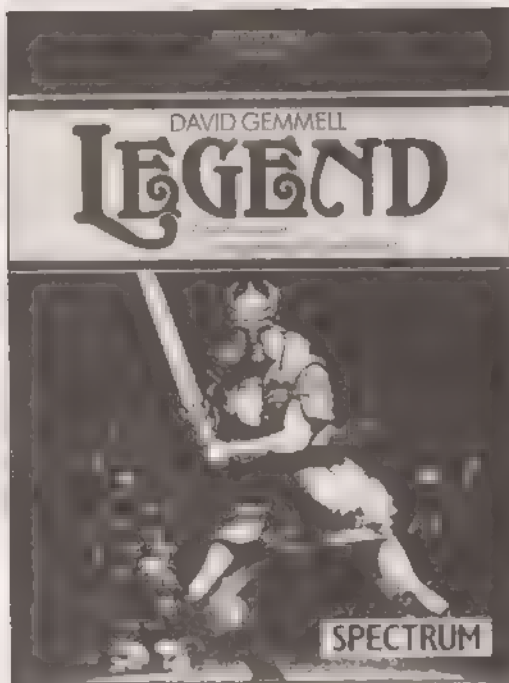
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board never actually touch the ground. I also found the key layout a bit unbalanced with almost all the new keys bunched on the left hand side. This is something you soon get used to.

Assembly of the new board is as simple as the blimp claims, involving only the removal of five screws and the two ribbon connectors of the Spectrum board and replacing them with about eight new screws, the new ribbons and a small clip on

interface. However, the whole system is let down by very poor documentation, which only makes sense once you have figured out for yourself how the thing must go together. It is also complicated by the inclusion of a few extra mystery screws and clips which I assume are for the other Saga peripherals, such as a sound amplifier that fits inside the case.

However, these are only minor criticisms and they shouldn't put you off. On the contrary, this is not only the most elegantly designed and styled add-on board for the Spectrum yet, but it is also a fairly construct-

ed and an absolute joy to use.

The keys themselves have a very positive feel and the layout is on the whole very good with a nice big space bar and two large

I has always annoyed me that so called 'professional' keyboards for the Spectrum have fallen short of anything that could really be used to obtain respectable typing speeds. Admittedly this is particularly the fault of the hopeless double shift and extended modes of the keyboard entry system. These present manufacturers with endless headaches if they want to provide a board that allows one keypress access to the various punctuation marks.

As I understand it, Sinclair themselves had to resort to special arms within the Spectrum + that physically depress diffe-

rent parts of the membrane to obtain the extra keys such as the semi-colon. On first opening the box of the Saga I, I dared to

hope that someone else had finally come up with a mechanism for doing the same, as most of the punctuation marks are represented on

their own as well as selected functions such as Edit and Delete that can only be

accessed using the shift keys. Disappointing as it may be, the Saga I does not have

common halfway to providing these features as they are no more than relabelled copies

of the original key and return the unshifted signal when pressed alone.

The idea is that it is easier to spot and use the most common functions and Saga have

provided no less than two cap shifts and four (count them) symbol shifts at usually

points all over the board. After some practice you realise that this is a good

compromise and makes the use of the keyboard easier and more pleasant. Keys

also exist for the unshifted functions Run, Load, List, Save and Cts. Here are also extra

controls in some extremely sensible positions on the board which unlike the Spec-

trum I, return the numbers 5-8 when unshifted so they will be fully compatible

with all existing software.

Some aspects of the design are irritating. The colour coding on the keys is inconsis-

ent, with symbol shifted functions being represented in various places in black, red

and green. This is not made easier by the fact that the various keywords on the main

Qwerty area are very hard to read, being much smaller than on the original Spectrum

which uses the area above and below the keys to carry a lot of information.

Perhaps to allow all the various interfaces to be connected, the bottom of the Spectrum board is actually screwed on beneath the

Saga, a system that works much better than I expected even though it does leave a

gaping hole around the edge connector. However, this does mean that four number feet provided at the bottom of the new

Professional

Hardware Datafax Disc Interface
Micro Sinclair Spectrum Price
£56.25 Supplier Statacom Distribu-
tion Ltd, 18 Grove Road, Sutton
Surrey

Some months back it seemed as if a whole bunch of disc interfaces were about to be launched for the Sinclair Spectrum. Very few of them actually saw the light of day, partly because of micro-

drives and partly because the Spectrum was not designed around a disc operating

system.

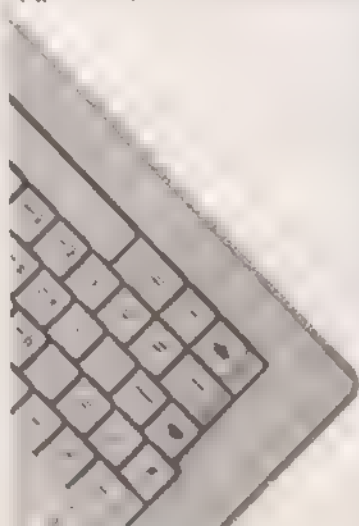
strongly-built and quite long black box, the latest attempt to get around this pro-

blem. Designed initially to run with a single



Tony Kendle

Enter keys. I think it knicks spots off the competition.



3-inch Hitachi-based drive (available from the same distributors for around £200, although ask them about an all-in-one price) the interface can be used with 3, 3.5, and 5.25 inch drives. A very simple operating system has been developed which allows you to load and save programs, data-arrays, and machine code. The only other facilities provided are to format new discs, to list a disc directory, to erase a saved file, and to make a backup copy of a whole disc.

By keeping the system this simple, the Datafax designers have managed to produce a very useable device which offers high-speed and high-reliability loading and saving without the need to learn a complex new way of using your computer. The interface offers a total capacity of just over 100K per disc side, although work is in hand to operate two drives and to increase the storage per drive. This 100K can be divided between up to 39 separate files.

But what about compatibility with existing hardware and software? In principle all hardware is compatible although this is achieved by the simple expedient of providing a hardware switch to control the expansion port provided. Thus you can switch between, say, joysticks and disc, but you cannot have them both on at once. Most software can also be used, including programs which use nearly all the normal Spectrum memory. This is because the interface permits its own software (which normally uses some of the free Ram) to be overwritten. A special loading procedure allows you to pack in the largest of programs, although you lose the screen display in the process.

John Cochrane

MATCH DAY



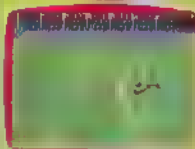
Match Day is no ordinary soccer game. It features a dynamic, realistic pitch and a realistic game play. It's an exciting, interactive, and fun way to experience the game.

leader of the game. Now follow the action.

Each player has a unique skill set. A perfect example is the 'Goalkeeper' who can take the ball from the hands of the opposition and throw it back into play.



Ship a team of players to the game. You can choose from a variety of teams to play with.



It's your turn. There is no limit to the number of players you can control. You can play as many as you want.

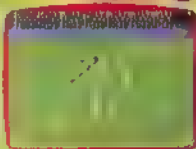
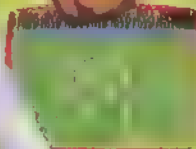
This powerful ball will take you to the top of the game. It's a real challenge to play with it.



It's your turn to take the ball. It's your turn to take the ball.



It's your turn to take the ball. It's your turn to take the ball.



Match Day is a complete game. It's a real challenge to play with it. It's your turn to take the ball. It's your turn to take the ball.

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Spectrum Shops and all good software dealers. Trade enquiries welcome.

Moving into reverse

An equation converter written for any Spectrum by Richard Armstrong

One of the biggest difficulties in using a language like Fort or Assembly language, is that expressions like $A+B+C$ have to be written as $AB+C$. This is known as Reverse Polish Notation. Converting to Reverse

Polish (or as it is sometimes known, Postfix) Notation can be difficult, especially if dealing with large expressions. Fortunately, an algorithm produced by a famous computer scientist called Edsger Dijkstra can do the conversion for us. This program is based on that algorithm.

The program is simple to use. Firstly the user is prompted to input the expression he wishes to be translated. The computer then prints out the corresponding Postfix expression. The program can handle the following operators: +, *, /, =, (,), Or, And. Operands are represented by the capital letters A to Z.

As an example, the expression $A-B$ And $C+D=E$ And Not A And Or AB should be entered direct from the keyboard, and not spelled out one letter at a time. When the prompt 'More? (Y/N)' appears, the user should press 'Y' to translate more expressions or 'N' to end the program.

The program works by considering each element of A in turn. If the element under consideration is an operand ($A..Z$) then it is printed. If the element is an operator ($+, *, /$, etc) then its priority must be considered. 'And', 'Or', 'Not' and 'N' are the next highest priority, 'And' and 'Or' being the last. Brackets raise the priority of what is printed until the stack is empty, or there is a left hand bracket on top of the stack, or (finally) the operator on the top of the stack has a lower priority than the element of A under consideration. The element being considered is then added to the stack. If the element being considered is a left hand bracket, then this is likewise added to the stack. If, however, the element of A is a right hand bracket, then the operators are removed from the stack and printed until a left hand bracket is found.

Program Notes

Line No

10-90 Print instructions and read expression to be translated

130-180 Loop to scan the input expression and call appropriate sub-routines

190-210 A routine to empty the stack

220-270 Decide if more expressions are to be converted

310-360 Print items from the stack until a left hand bracket is found

400-420 Drop an operator from the stack

430-460 Add the operator under consideration to the stack

490-580 Considers the priority of the operator under consideration and prints operators or adds operators to the stack as appropriate

Variables

As — Expression input for translation

SP — A 'stack' pointer used to keep track of the end of the stack

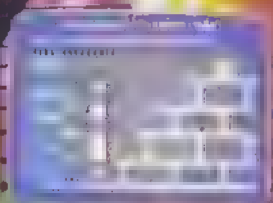
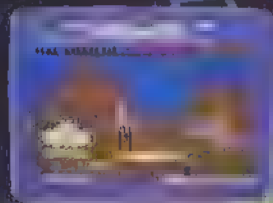
A — Loop control variable

```

10 REM INTRIX TO R.P.N.
20 LET SP=0
30 PRINT
40 PRINT "INPUT YOUR EXPRESSION"
40 PRINT "AND I WILL CONVERT IT TO REVERSE POLISH NOTATION, PLEASE TYPE ENTER, OR, AND, AS SINGLE LETTERS."
50 INPUT AS
60 PRINT AS
70 PRINT AS
80 PRINT "IS EQUIVALENT TO -"
90 PRINT
100 REM SCAN INPUT EXPRESSION
110 PRINT "*****"
120 FOR A=1 TO LEN AS
130 IF AS(A)="" THEN RS=RS+A
140 IF AS(A)="" THEN RS=RS+A
150 IF AS(A)="" THEN RS=RS+A
160 IF AS(A)="" THEN RS=RS+A
170 IF AS(A)="" THEN RS=RS+A
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880 IF AS(A)="" THEN RS=RS+A
890 IF AS(A)="" THEN RS=RS+A
900 IF AS(A)="" THEN RS=RS+A
910 IF AS(A)="" THEN RS=RS+A
920 IF AS(A)="" THEN RS=RS+A
930 IF AS(A)="" THEN RS=RS+A
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960 IF AS(A)="" THEN RS=RS+A
970 IF AS(A)="" THEN RS=RS+A
980 IF AS(A)="" THEN RS=RS+A
990 IF AS(A)="" THEN RS=RS+A
1000 IF AS(A)="" THEN RS=RS+A

```

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A useful filing program for Dragon 32 users written by W Patton

This is a program that allows you write your own filing system and have as many fields to a file as you want. It takes up 1.5K of memory and can store up to 300 entries.

The program is split up into several sections; Line 1 prints out the menu, Lines 20 and 30 get your command to go to the corresponding section of the program. Lines 40-80 are used by Option 1 where you are requested to type in the number of fields that the file you are creating requires. You then type in each entry, pressing Enter after each field has been typed in. When you want to finish typing, you must type 'XX' as the first entry to your last file.

Lines 100-110 are used by Option 2. These allow you to add more files to the end of your file. You enter data for this the same way as for Option 1 using 'XX' to return to the menu.

Line 120 is used by Option 3 and can be used to correct any mistakes made while entering your data. You are required to first state the file that the error is in, then the field. You then type in the new item and it will replace the old one.

Lines 130 and 140 are used by Option 4. This allows you to insert a file anywhere in the large file. You must type in the number at which you want the file to go in at, then you must type in the new file. Line 150 is used by Option 5. You must type in the number of the file that is to be deleted then that file will be erased.

Line 160 is used by Option 6 where the file is saved. You have to type in the name you want to call the file. After pressing Enter you are given a pause in which time you should press play and record on your cassette recorder. Line 170 is used by Option 7; the loading routine. You have to type in the name of the file to be loaded. When the file has loaded you return back to the menu.

Lines 180-200 are used by Option 8; the print out routine. You are first asked if you wish it to go to the screen or the printer. Press any key to step through the file. When all the file is printed out the program waits for you to press Enter before returning to the menu. Lines 210-230 are used by Option 9, where a word is searched for in the file. You just type in the word you are looking for in full, and the computer will search through the large file until it finds it.

Variables

A	= Number of fields
Array AS	= All of the file
EO	= Length of file + 1 in memory
XS	= General input
A1	= Value of key pressed
FX	= For next loop variables
NS	= Name of file to load or save
D	= General input

```

10 CLEAR 10000
10 CLS:PRINT"(1) START A NEW FILE":PRINT"(2) A
DD TO FILE":PRINT"(3) EDIT A FILE":PRINT"(4)
INSERT FILE":PRINT"(5) DELETE A FILE":PRINT
"(6) SAVE FILE":PRINT"(7) LOAD A FILE":PRINT"(
8) PRINT OUT FILE":PRINT"(9) SEARCH FOR A WORD
":PRINT"COMMAND"
20 XS=INKEY$:IF XS="" THEN 20 ELSE A1=VAL(XS):
IF A1<1 OR A1>9 THEN GOTO 10
30 ON A1 GOTO 40,100,120,130,150,160,170,180,2
10
40 CLEAR:INPUT"HOW MANY FIELDS",A:IF A<0 OR A>
11 THEN 40 ELSE DIM AS(300,A)
50 PRINT"TYPE 'XX' TO END"
60 FOR F=1 TO 300:PRINT"FILE ",F:FOR X=1 TO A
70 INPUT AS(F,X):NEXT X
80 IF AS(F,1)="XX" THEN EO=F:GOTO 10 ELSE NEXT
F
90 PRINT"FILE FULL":GOTO 10
100 FOR F=EO TO 300:PRINT"FILE ",F:FOR X=1 TO
A
110 GOTO 70
120 INPUT"WHICH FILE",F:INPUT"WHICH FIELD",X:I
NPUT"TYPE IN NEW ENTRY",AS(F,X):GOTO 10
130 INPUT"WHERE IS NEW FILE TO GO",D:IF D=EO
THEN GOTO 10 ELSE FOR F=EO TO D-1 STEP -1:FOR
X=1 TO A:AS(F+1,X)=AS(F,X):NEXT X,F
140 EO=EO+1:PRINT"TYPE IN NEW FILE":FOR X=1 TO
A INPUTAS(D,X):NEXT:GOTO 10
150 INPUT"WHICH FILE IS TOP DELETED",D:IF D=
EO THEN GOTO 10 ELSE FOR F=D TO EO:FOR X=1 TO
A:AS(F,X)=AS(F+1,X):NEXT X,F:EO=EO-1:GOTO 10
160 INPUT"NAME TO SAVE FILE UNDER",NS:PRINT"PR
ESS PLAY AND RECORD":FOR F=1 TO 1000:NEXT:OPEN
"D",#-1,NS:PRINT#-1,EO,A:FOR F=1 TO EO:FOR X=1
TO A:PRINT#-1,AS(F,X):NEXT X,F:CLOSE#-1:GOTO
10
170 INPUT"NAME OF FILE TO BE LOADED",NS:PRINT"
PRESS PLAY CASSETTE":OPEN"1",#-1,NS:INPUT#-1,E
O,A:FOR F=1 TO EO:FOR X=1 TO A:INPUT#-1,AS(F,X
):NEXT X,F:CLOSE#-1:GOTO 10
180 INPUT"(S)CREEN OR (P)RINTER",XS:IF XS="P"
THEN D=-2 ELSE D=0
190 FOR F=1 TO EO-1:PRINT#D,F:FOR X=1 TO A:PR
INT#D,AS(F,X):" ":NEXT
200 IF INKEY$="" THEN 200 ELSE PRINT#D:NEXT:IN
PUT"ENTER TO RETURN",X:GOTO 10
210 INPUT"TYPE IN WORD",XS:FOR F=1 TO EO:FOR X
=1 TO A:IF AS(F,X)=XS THEN 230 ELSE NEXT X,F
220 PRINT"WORD IS NOT THERE":INPUT"ENTER TO RE
TURN",X:GOTO 10
230 PRINTF:FOR X=1 TO A:PRINTAS(F,X):" ":NEX
TX:PRINT:INPUT"PRESS ENTER TO RETURN",X:GOTO 10

```

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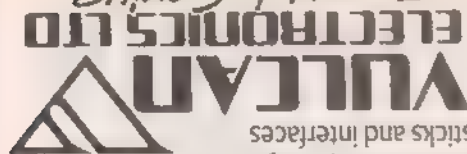
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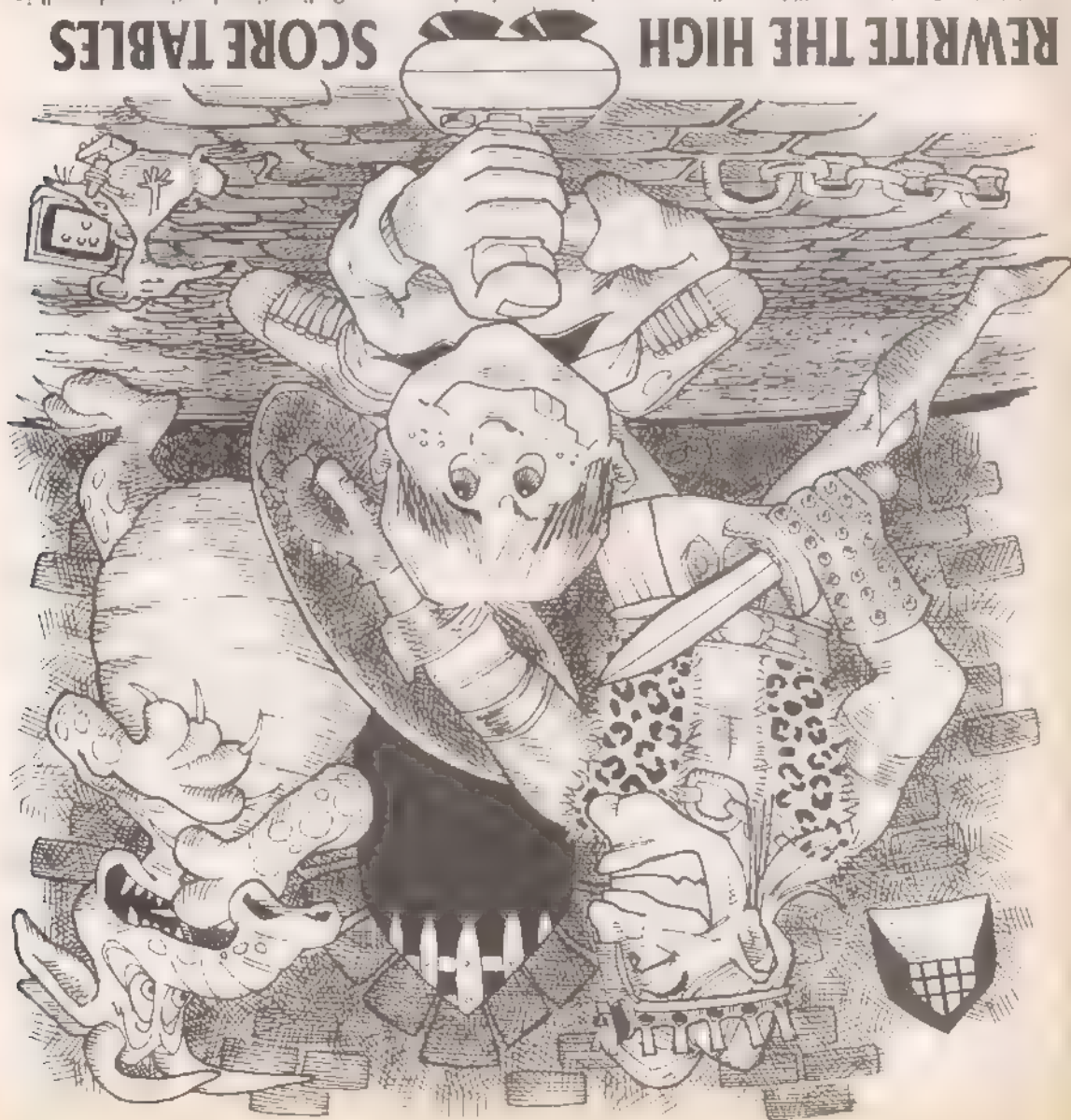
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REWRITE THE HIGH SCORE TABLES



In the parallel universe

Perfect Parallel Printing on the Commodore 64 courtesy of Adrian Warman

As many users of Commodore equipment will be aware, little provision is made for those who wish to use non-standard equipment, such as Centronics-equipped printers. A growth market for CBM users is the Parallel Printer interface package, which can range from cheap cable and minimal software, up to expensive hardware add-ons that do everything and cost a corresponding amount.

A typical software interface will come with a short cable to connect from the User Port to the Centronics Printer, and a small piece of machine code software. This software will usually reside in the spare Ram from \$C000 to \$CFFF, since this is untouched by Basic. Modifications are made to the Kernal vectors so that any attempt to access a given device number (say six) will re-directed out of the User Port as a parallel ASCII code.

Unfortunately, another growth market, extending the Basic on the CBM 64, also tends to produce packages which also use the \$C000 Ram. Such a package is the Simons' Basic cartridge, which uses the Ram for a variety of purposes, including Function Key definition. This means that if you want to have a worthwhile language, you may well be unable to use your Parallel Interface Program.

This article lists and describes a reasonably short Basic package which will drive a parallel interface, as long as you have a suitable connecting cable. The routines are detailed, and could be easily converted for use under other languages. For example, the extremely comprehensive Pascal Compiler from Oxford Computer Systems does not support parallel printers, so using the listed routines it is an easy job to define suitable procedures in Pascal to perform all necessary tasks.

The routines supplied are a little slower than machine code equivalents, and they do not check to ensure that the device is present and connected; however, they don't require any of the file channels, leaving them all free for other purposes.

The package consists of three subroutines. One is used to configure the CBM Input/Output chips to control the data lines. The next is used to place an ASCII character onto the data lines (and hence send it to any listening device). It will then wait for an acknowledgement that the character has been received. The last routine will restore the CBM I/O chips to prevent the parallel device being accessed further.

As an example of the routines used, a short program is added to the front of the listing which prints out the ASCII characters

from number 32 to number 127 inclusive.

Program notes

Line 140

This line calls the subroutine which will perform the equivalent of Basic 'OPEN' instruction. Since no 'file' is being used, no file number needs to be given.

Line 150

This is the start of the loop to print out the ASCII characters from 32 to 127 inclusive.

Line 160

The subroutine to output characters assumes that the ASCII code is stored in variable CHAR. If you wanted to use literal characters, you could use something like: Char = Asc ("a")

Line 170

This line calls the subroutine which will perform the equivalent of a Basic Print#x, Chr\$(y); instruction. Note that (as stated above) no file is used, and so no file number is required. In addition, the semicolon after the print instruction is always implied. Thus, to simulate a

continued on page 51

100 REM BASIC PARALLEL PRINTER ROUTINES.

110 :

120 REM BY A.WARMAN

130 :

140 GOSUB 60010

150 FOR X=32 TO 127

160 CHAR=X

170 GOSUB 60190

180 NEXT X

190 CHAR=13

200 GOSUB 60190

210 GOSUB 60110

220 STOP

230 :

60000 REM OPEN TO PRINTER.

60010 CIA2=56576

60020 POKE CIA2+3,255

60030 POKE CIA2+1,0

60040 POKE CIA+2,PEEK(CIA2+2) OR 4

60050 POKE CIA,PEEK(CIA2) OR 4

60060 POKE CIA2+13,16

60070 RETURN

60080 :

60090 :

60100 REM CLOSE ACCESS TO PRINTER.

60110 CIA2=56576

60120 POKE CIA2+13,0

60130 POKE CIA2+3,0

60140 POKE CIA2+2,PEEK(CIA2+2) AND 251

60150 RETURN

60160 :

60170 :

60180 REM PRINT OUT CHARACTER 'CHAR'.

60190 CIA2=56576

60200 POKE 49152,PEEK(CIA2+13)

60210 POKE CIA2+1,CHAR

60220 POKE CIA2,PEEK(CIA2) AND 251

60230 POKE CIA2,PEEK(CIA2) OR 4

60240 IF (PEEK(CIA2+13) AND 16)=0 THEN GOTO 60240

60250 RETURN

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DESIGN



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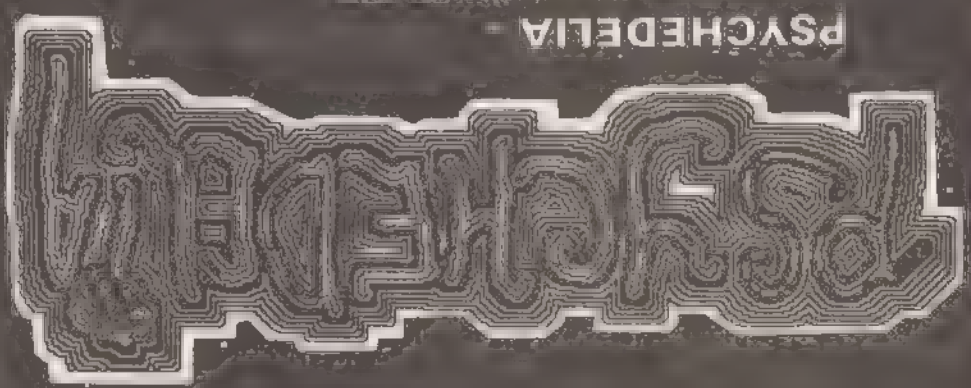
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Commodore 64

Print#x instruction (which would simply print a carriage return), you should use: *Char = 13:Gosub 60190*

Line 180 Go and do the next character (if there is one to do).

Lines 190-200 Output an *Ascii* carriage return <CR> character. This corresponds to the *Print#x* as described above, and on most parallel printers ensures that any text left in the input buffer will be printed.

Line 210 This line calls the subroutine which will prevent the I/O chips from trying to access any parallel devices on the User Port, by restoring default values.

Line 220 Halt the demonstration program.

Lines 60010 - 70 These lines are responsible for configuring the I/O chips to access the User Port in a manner suitable for controlling a parallel Centronics device. In its absolute minimum configuration, a parallel Centronics port requires eight data lines (called a 'bus'), a *strobe* line to show the parallel

Lines 60010 - 140

Lines 60190 - 250

device when the data on the bus is valid, and an *acknlg* line to show when the parallel device has accepted the data. The 8-bit bus is set up using Port B of CIA#2, which connects directly to the User Port (program lines 60020-60030). The *strobe* line is bit two of Port A (program lines 60040-60050). Finally, the *acknlg* line is set up using the Flag interrupt on CIA#2 (program line 60060).

These lines deselect the I/O chips to prevent them accessing the parallel device. The *acknlg* line is disabled so that it can no longer be read (program line 60120). Each of the 8 lines on the data bus is restored to an input line (program line 60130). Finally, the *strobe* line is redefined as an input line (program line 60140).

The key lines of the package. First, a read of the *acknlg* line must be made, in order to check it later (program line 60200) -- for the reason, see the *Programmers Reference*

Guide. Note that the data returned is placed in location 49152: simple for convenience! If you wish, you could replace program line 60200 with (say): *Let A = Peek (CIA2+13)*.

Next, the actual *Ascii* code is placed on the data bus (program line 60210). The *strobe* line is switched to show data ready (lines 60220-60230). Since the device may have a delay (such as moving the print head back to the next line), the program must wait for an acknowledgement via the *acknlg* line (program line 60240). Once this has been completed, the character has been sent and received, so we can exit the routine.

Hopefully, you should now see how to modify your own programs in order to incorporate the parallel interface routines. However, this does not get over the fact that a connecting cable is still required. Fortunately, these are available as stand-alone items from advertisers in magazines such as this esteemed paper!

Competition result

Flight Competition winner

The winner of the Flight Simulation Competition we ran in the September 6 issue is Simon Watson, aged 19, from Harlow in Essex.

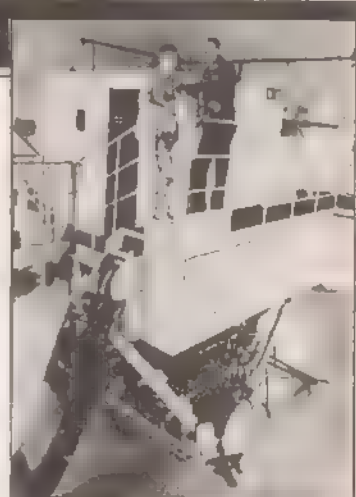
Last week he was awarded his prize — a chance to fly a real flight simulator used to

train commercial airline pilots at British Airways' Cranebrook training centre at Heathrow airport.

British Airways operates three flight simulators at Cranebrook, each of which stands about 40 feet tall and costs a staggering £10m apiece. The machine which Simon spent around two hours flying was a Boeing 737 simulator — a faithful reconstruction of the 737's cockpit supported twenty feet above the ground on powerful hydraulic rams. These are

controlled by two Vax mini-computers to move the cockpit according to the pilot's commands to accurately reproduce the effects of take-off and landing. The illusion is completed with four monitors suspended above the cockpit windows, projecting a high-resolution computer-generated picture of the runway, surrounding buildings, roads and skyline.

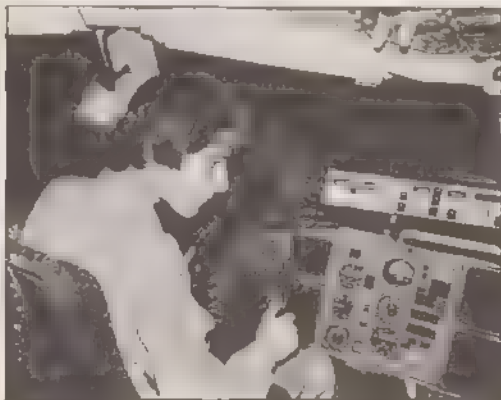
It was something of a surprise to discover that Simon already has some flying experience. He hopes to make flying his career and as a first step he



is trying to get private pilot's licence allowing him to fly light aircraft. Even though he has done some flying he has never tried to learn to drive — he says he couldn't afford to do both.

After his two-hour flight he persuaded British Airways' Boeing Training Captain, Roger Benham, to log the simulator 'familiarisation' in his flight record.

Now Simon is looking for a sponsor so that he can continue with his ambition to become a commercial helicopter pilot.



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Kokotoni Will from Elite Software — one of this Autumn's top selling games on both the Commodore 64 and the Spectrum is to have a sequel. The plot? — that's for you to decide!

Popular Computing Weekly offers you the chance to use your own ideas, characters, plot and so on to create the sequel to *Kokotoni Will* which will be published by Elite in the new year.

The winner(s) will be credited with the storyline design in all advertising and promotion, and the winner(s) name(s) will be featured in the packaging. In addition, a royalty of 6% of sales achieved will be paid to the winning designer or design team.

What we want you to do

The competition is open to both individual designers or design teams. You are not asked to actually program the game. All you have to do is to prepare a storyboard — a series of screen drawings or sketches — for the sequel which should explain the action from the first screen to the last.

The finished storyboard should be detailed enough for Elite's programmers and designers to use without any major changes — set yourself a limit of no less than 20 screens of action and no more than 60. It might be helpful to divide your storyboard into two sections, a general guide to the story including overall objectives and method of scoring, etc (limit yourself to a maximum of 800 words). The second section should be much more specific detailing exactly what is going on where in each screen, indicating such things as sprites, background layout and movement paths. To help you, we show on the right one such storyboard from a screen in the first *Kokotoni Will* program.

How to enter

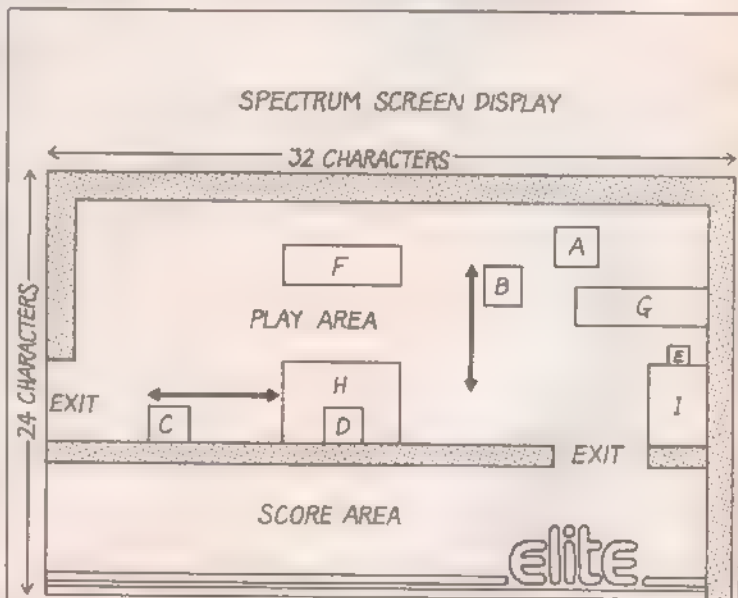
Completed storylines and storyboards should be submitted to *Kokotoni Will* Competition, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2H 7PP, to arrive no later than 1 January 1985.

All entrants requiring an acknowledgment of receipt should submit a stamped self-addressed envelope. Entrants requiring their work to be returned after judging should send a suitable post paid self-addressed envelope with the entry.

The judges decision will be final. Don't forget to include your name and address! Ten runners up will receive copies of the game which will be produced for the Spectrum and Commodore 64.

It is important to remember that the program you create is to be a sequel and so, in a general way, you should maintain the theme and atmosphere of the original. For anyone not familiar with *Kokotoni Will* here is the story so far:

"Legend has it that many hundreds of years ago somewhere in Northern Europe lived a great Magician known as Ulrich. Ulrich knew of a magic amulet, fragments of which had been scattered throughout time. Ulrich wished to wield its power, but he was too old and infirm for such an arduous adventure and so charged his protege Kokotoni Will with the epic task. Ulrich sent Will back in time to the age of the great dinosaurs, there to begin his quest through the ages for each fragment of the Amulet. Ulrich has provided Will with magic wings and time gates to pass from age to age — your task is to guide Will in his epic quest."



TIME-ZONE 3 : SCREEN 1

- A : STARTING POSITION OF KOKOTONI WILL
- B : STARTING POSITION OF 'BOOK' SPRITE
- C : STARTING POSITION OF 'BOILING POT' SPRITE
- D : ANIMATED 'FIRE' SPRITE
- E : LOCATION OF AMULET FRAGMENT
- F, G, H, I : SKULL SHELF; POTS SHELF; OPEN RANGE; SKELETON.

BOLD ARROWS SHOW SPRITE MOVEMENT PATTERNS.
SHADED AREA SHOWS IMPENETRABLE BORDERS.

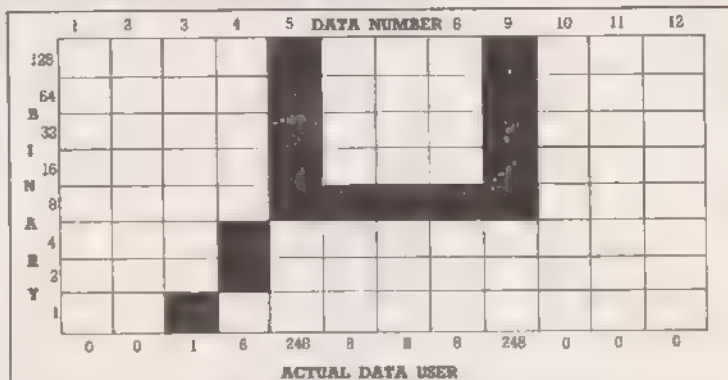
Reform your character

User-defined graphics on your Epson made easy on the BBC B by A Fennell

This program allows you to produce User Defined Graphics on the Epson FX80 printer. The character is defined on an 8 by 12 grid (see right) - as explained in the printer manual - and these values are stored in the Data statements at Lines 40 & 50.

The first numbers are the *Ascii* codes for the characters to be changed, ie [=91. Any character could be used.

As I have shown in the program, the UDG can be used with normal characters (once it has been defined) but the printer must be set back to the original character set, using *Procbactonormal*, (see Line 120 for example). I have created a μ and a # sign as examples, but the only real limit is your own inventiveness.



```

10 REM program to produce UDG on the FX-80 printer.see page 3-38
   of manual.produces a mu sign VDU2 enables the printer
   VDU3 disables the printer VDU1 sends next character to
20 REM the printer only
30 VDU 2
40 DATA 64,0,0,1,6,248,8,8,8,248,0,0,0:REM μ => MU ON PRINTER
50 DATA 91,0,36,126,126,36,126,126,36,0,0,0,0:REM £ => £ ON PRINTER
60 PROCCREATECHARACTER
70 PROCCREATECHARACTER
80 VDU 3
90 VDU 2
100 PRINT "####[]"
110 PROCBACKTONORMAL
120 PRINT:PRINT "WE CAN ALSO USE THE CHARACTER ";:RESTORE
40:PROCCREATECHARACTER:PRINT "@"::PROCBACKTONORMAL:PRINT " IN A SENTENCE"
130 VDU 3
140 STOP
150 DEF PROCCREATECHARACTER
160 REM
170 REM PRINT CHR$(27);"&";CHR$(0);CHR$(£);CHR$(£);
180 REM READ IN THE ASCII VALUE OF THE NEW CHARACTER
190 READ A
200 VDU 1,27:VDU 1,38:VDU 1,0:VDU 1,A:VDU 1,A
210 REM
220 REM PRINT CHR$(139);
230 VDU 1,139
240 REM
250 REM DEFINE THE 8*12 SHAPE FOR THE CHARACTER
260 FOR I=1 TO 12:READ A:VDU 1,A:NEXT
270 REM
280 REM PRINT CHR$(27);"%";CHR$(1);CHR$(0)
290 VDU 1,27:VDU 1,37:VDU 1,1:VDU 1,0
300 ENDPROC
310 DEF PROCBACKTONORMAL
320 REM return printer characters to normal
330 VDU 1,27:VDU 1,37:VDU 1,0:VDU 1,0
340 ENDPROC

```



Bristles



Bristles, outrageous graphics, dazzling game play, testing quick reactions, concentration, logic and strategy, It is mind (and Joy-stick) boggling!! Featuring Sex-Select, you can choose either boy or girl painters.

Bristles features different game screens and skill levels for each building. Scramble to paint the entire building while avoiding the smart Bucket Chucker, Dumb Buckets and flying Half-Pints.

Take the lifts, climb the stairs and watch out for the caretaker's daughter; she puts her hand prints all over the place! Then there's prizes, candy canes, "Invisible paint"...

With fully animated characters, (music) sound effects, multiple screens and beautiful graphics, you can't help but want to add Bristles to your collection of Spectrum games.



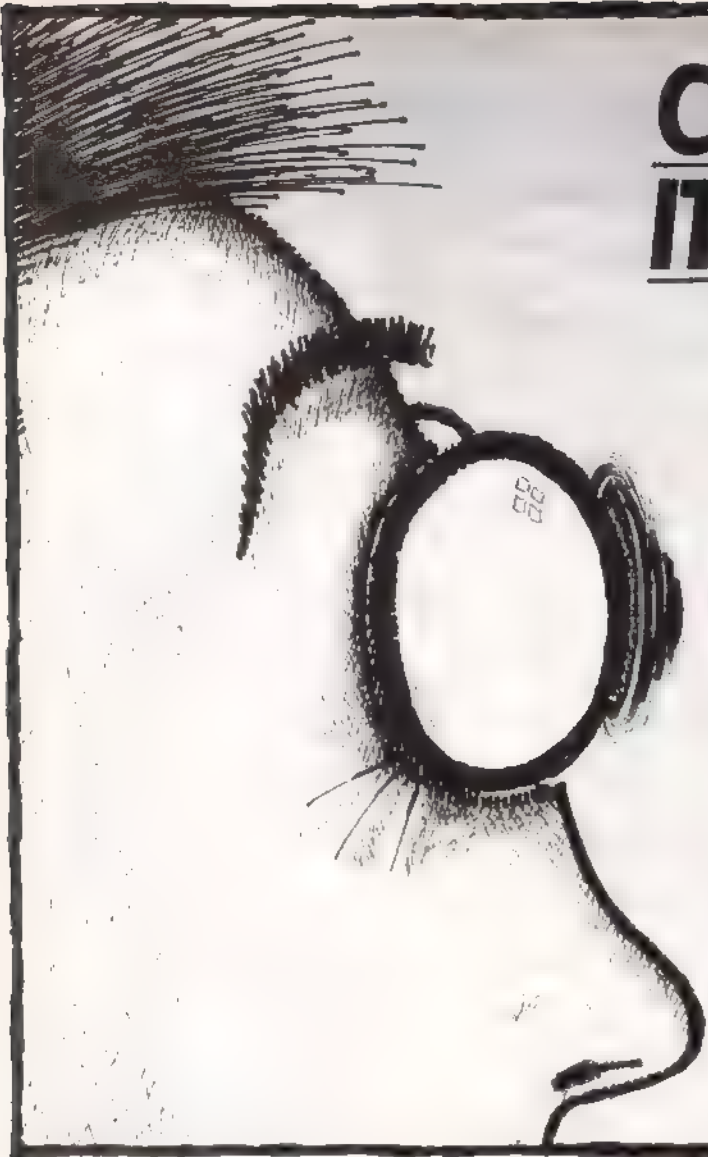
48 LEVELS

For The Sinclair Spectrum 48k £7.95

State Soft Limited Business & Technology Centre Bessemer Drive
STEVENAGE Hertfordshire SG1 2DX Tel: (0438) 317583

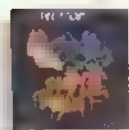


CBS COMPUTER IT MAKES EVERY LOOK JUST



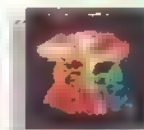
If you're tough, you'll still need to be tougher. If you're quick, you'll still need to be quicker. If you're smart, you'll still need to be smarter.

Because CBS Computer Software is here with EPYX — a range of action-strategy programs from the U.S. that will make whatever you've played before look like just a game.



PIT STOP

Turnback and outpace the likes that were a pit stop away from you. The best of the best in the game world.



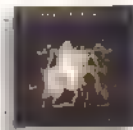
IMPOSSIBLE MISSION

Survive the mission, the trap, and the pit. A person in a red suit, a person in a red suit, a person in a red suit.



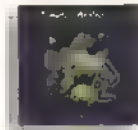
BREAKDANCE

Breakdance is a game where you can breakdance. The game is a game where you can breakdance.



SILICON WARRIOR

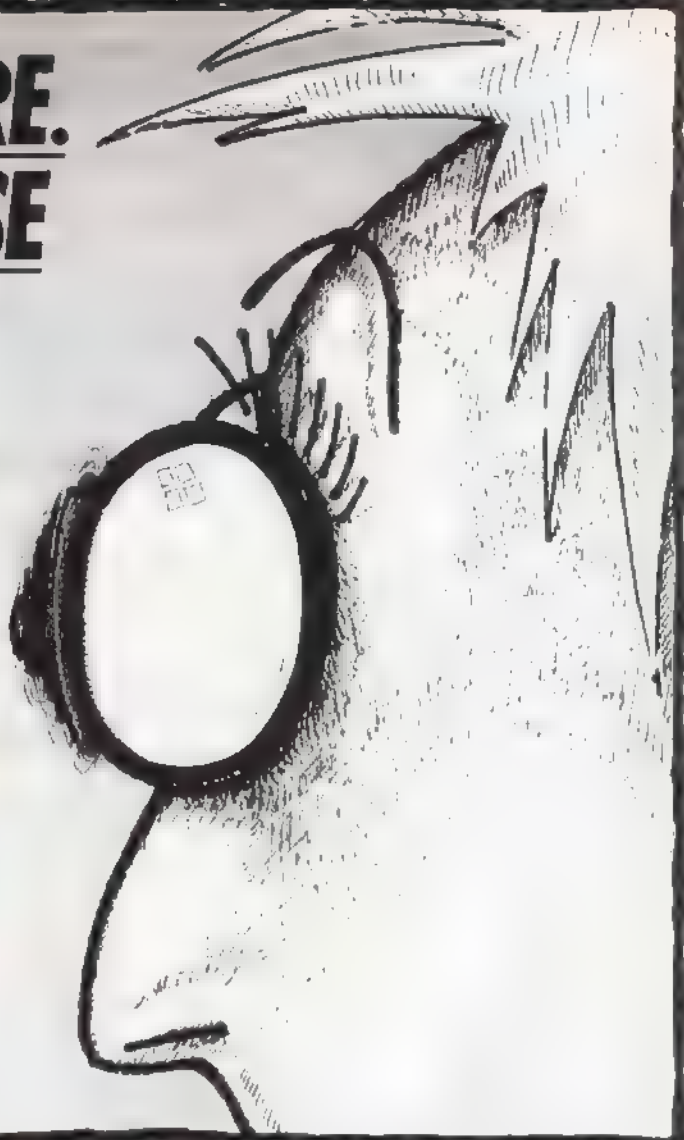
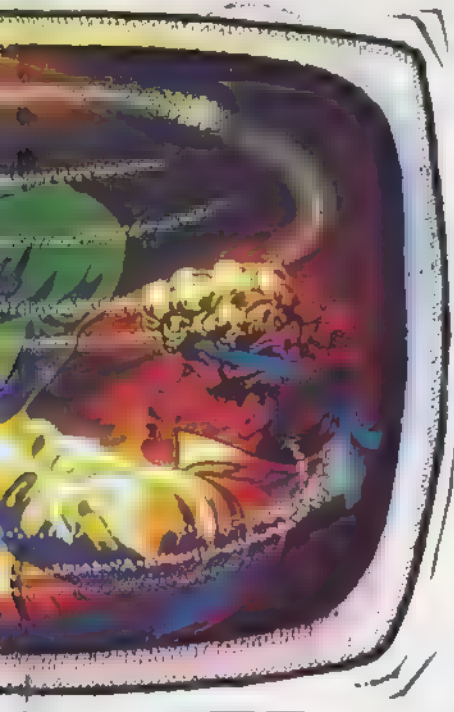
Competition is the name of the game. The game is a game where you can compete.



TEMPLE OF APSHAI

Apshai is a game where you can play. The game is a game where you can play.

TER SOFTWARE. EVERYTHING ELSE PLAIN SOFT.



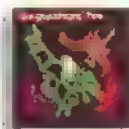
EPYX come on disk or cassette and, for the first time in the U.K., both systems are available in one-size packaging, colour coded for hardware compatibility.

EPYX from CBS Computer Software. They're good. Play them and find out the hard way just how good. Look out for the first eight adventures now.



JUMPMAN

Running, jumping, climbing, outwitting the 30-grade game created no one with your single mouse and sound.



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LUNAR OUTPOST

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FOR COMMODORE 64

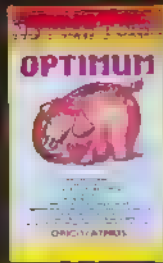
EPYX
COMPUTER SOFTWARE

Available from all good computer outlets. Authorised dealers only. The CBS Computer Software Group, 10000 Wilshire Blvd, Suite 1000, Los Angeles, CA 90024, U.S.A. or 10000 Wilshire Blvd, Suite 1000, Los Angeles, CA 90024, U.S.A. or 10000 Wilshire Blvd, Suite 1000, Los Angeles, CA 90024, U.S.A.

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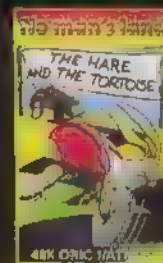
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Routine input

For easier inputting and editing of your data a program from M J Amess

This program consists of one major procedure, called *Cinput*, which provides a convenient method for accepting data from the user's terminal. It provides a number of data formats to allow almost any type of data to be entered and checked for validity.

This routine can reside at the end of your own programs and be called whenever data input is required. It is called by typing *Cinput* and is followed by a list of formal parameters, which will supply data for the procedure. To see what formal parameters are used look at Line 30020 which defines the procedure. The parameters used are, *Row*, *Col*, *Max*, *Min*, *Types*, *Old Ink*, *Old Paper*. *Row* and *Col* define the screen coordinates at which the data is to be accepted. *Max* and *Min* are used to define the maximum and minimum number of characters that are to be accepted by the procedure.

The *Cinput* procedure types periods (.) at the specified screen position to show the user the maximum number of characters allowed (taken from the value entered in the *Max* variable). In case of an error whilst

entering data, messages are displayed in Screen #0.

The most important parameter that must be entered is *Types*. This is a one or two character string defining the type of data to be entered. There are eight main types which are:

- 1) 'D' = Enter a date, in the format DDMMYY. This is edited for a valid Day and Month and redisplayed in DD/MM/YY format.
- 2) 'A' = Alphanumeric. All characters are valid.
- 3) 'In' = Enter any positive integer numeric.
- 4) 'N' = Accept any positive numeric and display it in a monetary form. The numeric is entered without a decimal point. For example, if 10021 is entered this is automatically redisplayed as 100.21.
- 5) 'NN' = Negative numeric. This is exactly the same as the 'N' type except that the numeric entered is changed to a negative. The user enters the numeric as a positive and the computer redisplay the value as a negative.
- 6) 'Y' = Accept Yes/No or Esc. The computer will await the user to press either the 'Y', 'N'

or 'Esc' keys. Pushing the 'Enter' key will have the same effect as pushing the 'Y' key. 7) 'P' = Accepts an alphanumeric password. This type uses the *Old Ink* and *Old Paper* variables so that any typed data is not displayed in a visible form on the screen. These two variables must be set to the current *Ink* and *Paper* values that are being used.

8) 'V' = Verification — accepts only a carriage return (enter key).

All data which is entered is stored in the variable *Entry*, even numeric data, which can be stored later in a numeric variable.

One final facility is that instead of entering the expected data you may enter *End* (or push the Esc key in the 'Y' option). This sets a variable, *Inxcl*, to 3 which could signify that the user wishes to escape from a particular option within his/her program. During normal use *Inxcl* will be set to zero if the procedure is completed Ok. If 'Y' is pushed in the Yes/No field then *Inxcl* is set to 1, or if 'N' is pushed then *Inxcl* will equal 2.

The following is an example of the *Cinput* procedure. Type, *Cinput 10,5,20,5,'A'*.

This will accept any alphanumeric data at position 10,5 on the terminal. The maximum number of characters that will be accepted is 20 and the minimum is 5. Please note that the *Ink* and *Paper* variables need only be entered when using the password option,

```

30000 REMARK ENHANCED INPUT ROUTINE
30005 REMARK COPYRIGHT 1984 M.J.AMESS
30010 REMARK VERSION R31.0A 19/02/84
30015 REMARK ** **
30020 DEFINE PROCEDURE CINPUT:ROW,COL,MAX,MIN,
TYPE$,OLD,INK,OLD,PAPER,
30025 INXCL=0:CLS #0
30030 IF TYPE$="D" THEN DATEENTER
30035 IF TYPE$="A" THEN ALPHA
30040 IF TYPE$="N" OR TYPE$="NN" OR TYPE$="IN"
THEN NUMERIC
30045 IF TYPE$="Y" THEN YES/NO
30050 IF TYPE$="P" THEN PASSWORD
30055 IF TYPE$="V" THEN VERIFY
30060 END DEFINE CINPUT
30065 REMARK ***** ENTER DATE *****
30070 DEFINE PROCEDURE DATE ENTER
30075 MIN:=1:MAX:=4
30080 REPEAT LOOP
30085 ENTER VALUE
30090 IF INXCL=3 THEN EXIT LOOP
30095 SET=0
30100 REPEAT MIN:=0:MAX:=LENGTH IF SET THEN GO
TO 30085
30105 MONTHS=ENTRY$(3 TO 4) YEARS=ENTRY$(5
TO 6)
30110 DTE$=ENTRY$(1 TO 2)
30115 IF MONTHS < 1 OR MONTHS > 12 THEN SET=1
30120 IF DTE$ < 31 OR DTE$ > 1 THEN SET=1
30125 IF DTE$ < 24 AND MONTHS=2 THEN SET=1
30130 IF MONTHS=4 OR MONTHS=6 OR MONTHS=9 OR
MONTHS=11 THEN
30135 IF DTE$=31 THEN SET=1
30140 END IF
30145 IF NOT SET THEN EXIT LOOP
30150 END REPEAT LOOP
30155 IF INXCL < 3 THEN
30160 AT ROW COL PRINT DTE$,"/"/MONTHS," "
YEAR$
30165 END IF
30170 END DEFINE DATE ENTER
30175 REMARK ***** ENTER ANY ALPHANUMERIC
*****
30180 DEFINE PROCEDURE ALPHA
30185 REPEAT LOOP
30190 ENTER VALUE
30195 IF INXCL=3 THEN EXIT LOOP
30200 SET=0:CH=LENGTH
30205 IF NOT SET THEN EXIT LOOP
30210 END REPEAT LOOP
30215 END DEFINE ALPHA
30220 REMARK ***** ENTER NUMERIC *****
30225 DEFINE PROCEDURE NUMERIC
30230 REPEAT LOOP
30235 ENTER VALUE
30240 IF INXCL=3 THEN EXIT LOOP
30245 SET=0:CH=LENGTH
30250 IF SET THEN GO TO 30235
30255 SET=0
30260 FOR VALUE=1 TO LEN(ENTRY$)
30265 IF VALUE=ENTRY$(VALUE) < 48 OR CODE(ENT
RY$(VALUE)) > 57 THEN SET=1
30270 END FOR VALUE
30275 IF SET THEN GO TO 30235
30280 IF TYPE$="IN" THEN GO TO 30315
30285 IF LEN(ENTRY$) > 2 THEN ENTRY$="0" &
ENTRY$ GO TO 30295
30290 IF LEN(ENTRY$) = 1 THEN ENTRY$="00" &
ENTRY$
30295 LINES=ENTRY$(1 TO (LEN(ENTRY$)-2))
30300 LINES=LINES & "." LINES=LINES & ENTRY$(
LEN(ENTRY$)-1 TO LEN(ENTRY$))
30305 ENTRY$=LINES
30310 AT ROW,COL CLS #1,4:PRINT ENTRY$
30315 IF NOT SET THEN EXIT LOOP

```


```

30320 END REPEAT LOOP
30325 IF TYPE$="NN" THEN
30330 ENTRY$="" : ENTRY%
30335 AT ROM:COL CLS #14:PRINT ENTRY$
30340 END IF
30345 END: DEFINE NUMERIC
30350 REMARK ***** SELECT "Y","N" OR ESC *****
30355 DEFINE PROCEDURE YES_NO
30360 MIN=1 MAX=1
30365 REPEAT FIND_LOOP
30370 DOT PRINT " " AT POW:POW
30375 #CODE INKEY$=1
30380 IF #C9 OR #E9 OR #F9 OR #D9 THEN EXIT FIND_LOOP
30385 END REPEAT FIND_LOOP
30390 IF #E9 THEN AT ROM:COL :PRINT "ESC"
INXCTL=1
30395 IF #E9 THEN INXCTL=2 AT ROM:COL:PRINT "N"
30400 IF #E9 OR #F9 THEN INXCTL=1
30405 END: DEFINE YES_NO
30410 REMARK ***** ENTER PASSWORD *****
30415 DEFINE PROCEDURE PASSWORD
30420 THE:OLD: PAPER
30425 REPEAT LOOP
30430 ENTER:VALUE
30435 IF INXCTL THEN EXIT LOOP
30440 #E9:CHK:LENGTH
30445 IF NOT SET THEN EXIT LOOP
30450 END REPEAT LOOP
30455 THE:OLD: PAPER
30460 END: DEFINE PASSWORD
30465 REMARK ***** VERIFICATION *****
30470 DEFINE PROCEDURE VERIFY
30475 MIN=0 MAX=0
30480 REPEAT LOOP
30485 #E9
30490 ENTER:VALUE
30495 CHK:LENGTH IF NOT SET THEN EXIT LOOP
30500 END REPEAT LOOP
30505 END: DEFINE VERIFY
30510 STOP
30515 DEFINE PROCEDURE L4:1
30520 AT ROM:COL CLS #14
30525 IF TYPE$="P" THEN IN:OLD:PAPER
30530 PRINT "ENTER:VALUE"
30535 AT ROM:COL CLS #14
30540 #E9: INPUT ENTRY$
30545 IF ENTRY$="" THEN RETURN
30550 IF ENTRY$=1 TO "END" AND LEN(ENTRY$)=3 THEN INXCTL=3
30555 END: DEFINE ENTER
30560 DEFINE PROCEDURE CHK_LENGTH
30565 IF LEN(ENTRY$) > MAX THEN
30570 INPUT #E9: ENTRY TOO LONG - OK TO CONTINUE" #E9: CLS #0:SET=1
30575 END IF
30580 END: DEFINE CHK_LENGTH

```

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Inside Arnold

Take a peek inside the depths of the Amstrad Rom with Colin Harris from Nemesis Software.

It is interesting to note that although the

since July, the reports of 'bugs' have been very few. Indeed the only mention I recall is the absence of an explanation of the operator 'Mod' in the Handbook, but that doesn't really count. The traditional well-come to a new computer is the 'bug' report. Is the absence of these some kind of dubious accolade for the Amstrad? Notably, however, there has been more than one complaint that owners are unable to nose through the Operating System, more simply the Rom.

The Rom in the CPC664 is split into two sections. One section of 16K occupies addresses 0-3FFF (HEX) — almost, anyway. The upper Rom occupies C000-FFFF (HEX), and in doing so overlays the screen Ram. The lower Rom overlays part of the user Ram. This arrangement with clever switching releases the maximum possible area to user Ram during Basic operations. It is because of this that the Rom seems to be one like program for the Dragon to produce a Hex or Character Dump of the Rom. No such simple method will work with the Amstrad.

In complete contrast to other computer

Nevertheless, to assemble this program gives one useful experience of the Amstrad's Rom routines and this of course leads to a Basic program to enter the code. Listing B is the assembly list. Listing A is the program for those without an assembler. Paying special attention to the Hex number type in the Basic program exactly as listed.

Listing A — The Basic Program

Line 100 holds the message from Line 90 on the screen for long enough to be read, then the Basic program self-destructs, leaving the machine-code in reserved memory.

Program Notes

Line 20 sets Rantop.
Line 30 defines the numeric keypad dot to call the machine-code program.
Lines 40-70 convert the hex numbers read from data to a form that is poked into the reserved Ram. Also a checksum is generated to virtually ensure that only a correct entry is offered to run.
Line 100 holds the message from Line 90 on the screen for long enough to be read, then the Basic program self-destructs, leaving the machine-code in reserved memory.

Having entered it make a copy on tape etc.

beta, 'the letters a to f' which are used in the hex system are shown in lower case, as this way one is less likely to confuse B with 8.

Call 42001 executes the program. Define a key to do this as in Line 30 of the Basic program.
ROM, B. 41656, 971, 42801.
can now be saved to tape by: Save "HIL-O- the program. The machine code program and try again. Now see the notes on using located your error(s) re-save the program 32 sets of hex numbers. When you have data statement (the last has 1 only) contains and rectify the error. Check that each entering the data, you will have to check if program. If you have made an error in will poke the code into reserved Ram, and the screen will invite you to Call the before running it. It is as well the program Having entered it make a copy on tape

Lines 110 to 410 contain the data representing the machine code.

Listing B — the Assembler Listing

The assembly listing was not written to be a model of assembly programming, nor to be the most efficient method or even a structured method. It was written to investigate the use of Rom routines and as such it is worth examination. It undoubtedly will extend to a full blown monitor. If you attempt this you will discover that the *Concise Firmware Specification* has everything you need.

Program Notes

Lines 5-250 define the text for a simple menu and label some Rom routines for the program proper.

Lines 260-380 place menu to screen using colour and pass to Line 1600 (Holdup).

Holdup awaits input and then passes control to the appropriate routine. You should be able to follow from there the routines for curpurping the hex-dump and character dump. Note the highlighting of Ascii-characters in the dump, by use of colour changes. The Rom routines used (with their official names) are:

- #B85A Txt Output — Outputs a character or control code to the text VDU.
- #B81B Km Wait Key — Waits for next key from the keyboard.
- #B81B Km Read Key — As #B81B but doesn't wait.
- #B890 Txt Set Prio — Set up for writing colours.

- #B800 Ki U Rom Enable — Turn on the Upper Rom.
- #B803 Ki U Rom Disable — Turn off the Upper Rom.
- #B806 Ki L Rom Enable — Turn on the Lower Rom.
- #B809 Ki L Rom Disable — Turn off the Lower Rom.
- #B875 Txt Set Cursor — Set cursor position.
- #B87E Txt Cur Disable — Disallow cursor display.
- #B88D Txt Wr Char — Write a character to the screen — control codes are printed and not obeyed.
- #B843 Km Reset — Reset key manage, clear all buffers, restore standard key expansions and instructions.

Using the Program

When initiated the program offers a Menu. First press **Caps Lock** and then press the letter corresponding to the memory you wish to examine.

L will be the hex and character dump of Low Rom from address 0 (it actually starts somewhat later) to #3FFF. It will stop at the end and return to Menu. **R** will similarly deal with the High Rom ending at #FFFF. **R** deals with all Ram up to #BFFF (the memory that follows is the default screen memory).

Enter will stop the display to allow closer inspection. Also whilst 'stopped' you have the option to rapidly advance the memory display in increments of 256-bytes by pressing **I**. When the indicator reaches the desired address press **C** to continue. Alternatively **E** will return to Basic or **Q** will return

Menu. **Enter** will resume display and scroll.

Screen Display

From left to right the screen display consists of: Hex Address; eight hex values (the first corresponds to the Hex Addr. The remainder correspond to the previous address plus 1).

These are then followed by the character representation of the hex values. The next line increments the address by 8 and so on.

The hex dump is interesting, as it displays text embedded in the operating system. In Low Rom you will discover after the titles some strange names — Schneider for example. Even Arnold, the pet name for the machine, is mentioned. High Rom lists all the error codes. Well, have a look and see!

Potentially the Hex-dump can be very useful. Look for C9 (this is a return instruction) — the codes following this may well be the start of a useful sub-routine.

Within the bounds of a small article and one simple program, many points will go unmentioned — much will be oversimplified.

I hope to have given you a new slant to your machine without incurring too many 'tuts tuts' from those that know more, and those that know better!

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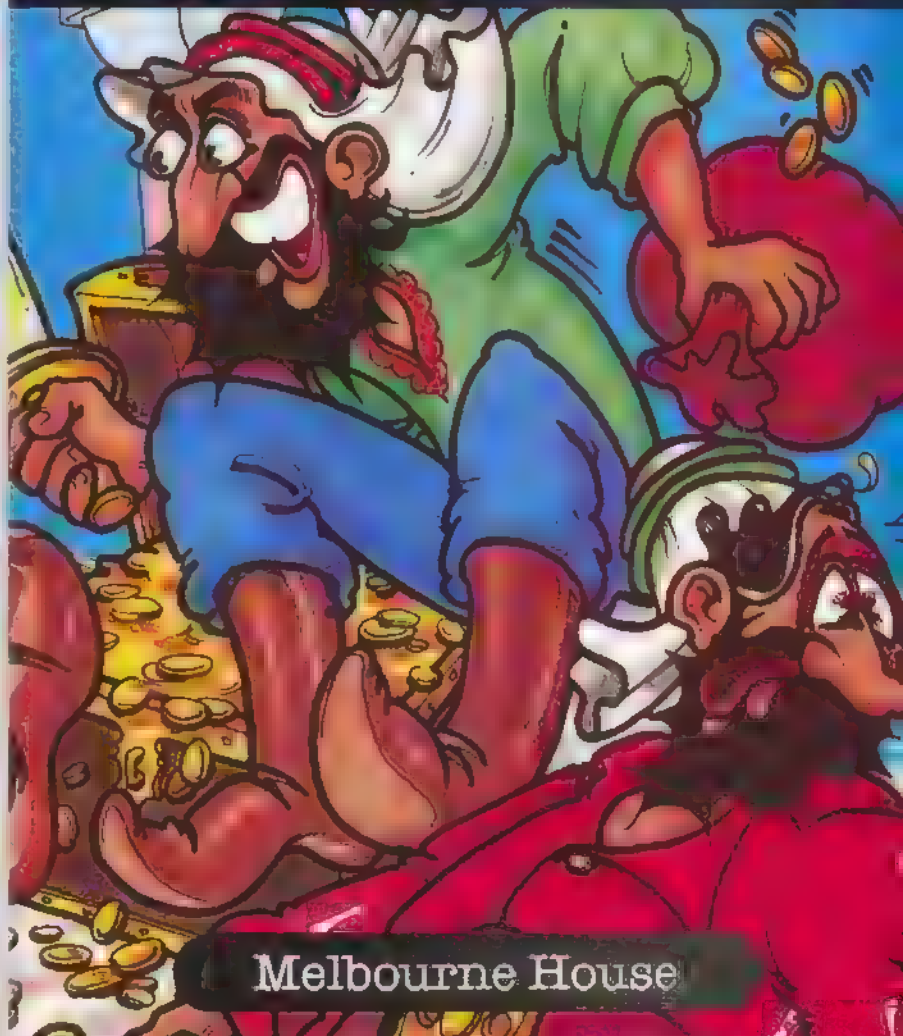
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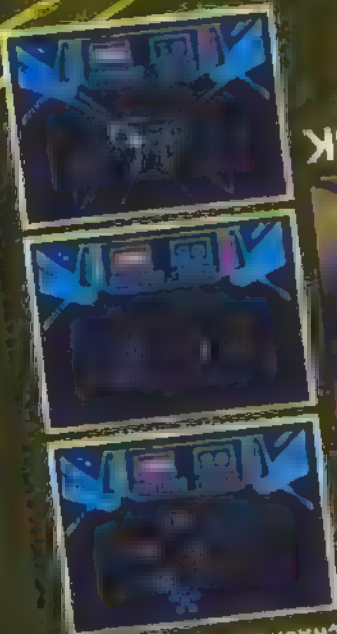
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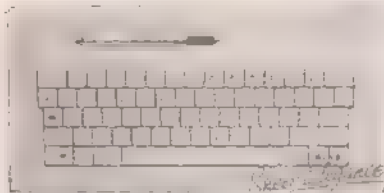
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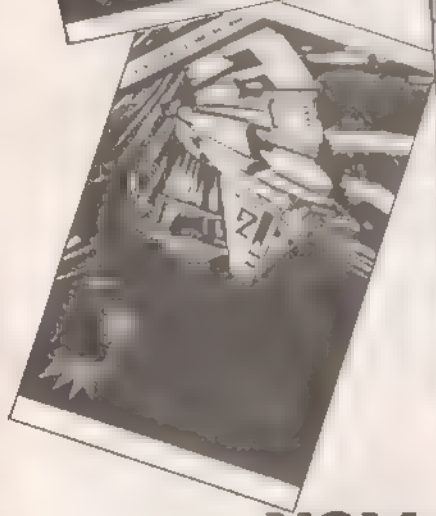
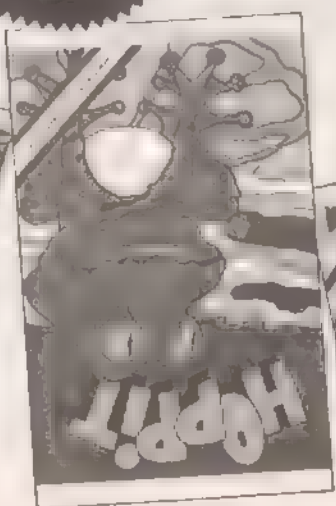
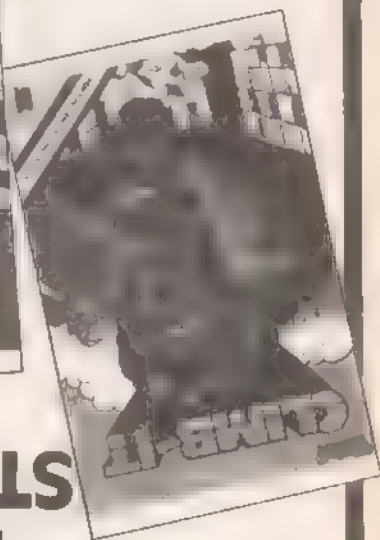
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doing it. get but for the challenge of not for the information they can enjoy breaking into a system hackers — the people who bad news by most traditional. It's probably also seen as along the corridors of BT and types of outrage ring out dikes once again and

Breaking in



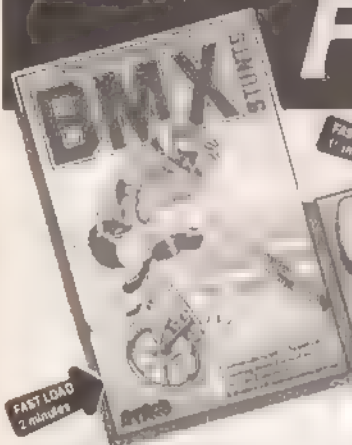
Baud Walk

I don't wish to condone hacking but there is a difference between the new leeway and the old style traditionalists. The former are likely to subvertally reduce the facilities available on databases as operators, shocked by the damage done, tighten up. There was nothing particularly clever about this latest hacking of Prestel. As I understand it, it was more to do with the system management than some clever microbreak cracking a mysterious code. Similarly the episode when Telecom Gold was hacked on a live TV show probably had more to do with users not guarding their accounts than the equivalent of your

cheque card signature) subtly gap and don't mess about with the system to cause embarrassments otherwise the consequences will be much less flexible databases. N.B. If you are using a database with account numbers and log-on passwords changing them every week. And select odd combinations of letters and numbers. Any readers with experience of networking are asked to send their expertise or news of services to: Robert Wilkinson, Baud Walk Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 8LD. Please dialbox 019393721.

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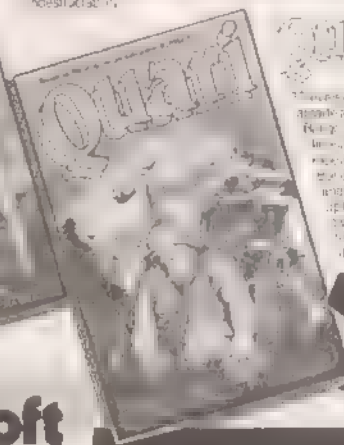
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Line Feed

on Amstrad

As the User Manual informs you, the Amstrad Basic issues a line feed *Ctrl*(10) and a carriage return *Ctrl*(13) to a printer. If your printer, as mine does, also line feeds then list produces a double spacing. My

following:

PRNZ 1 — Jump if not
CP 10 — Compare A with 10

43000 and Pokes into 43000-43008 the amended My program Pokes a jump to

\$8D2B which is Ram and so can be The jumpblock (or printing a character is

detect *Ctrl*(10) and in change it

ADP A,A — Doubles A to 20

RST 08 — Default codes at \$8D2D

is CFF28C

Width 255 then list, #8. You should get a normal listing.

For future use Save this program, then

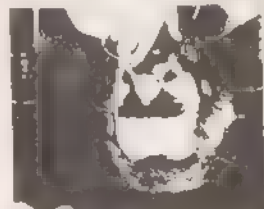
Load the program you wish to list.

Width 255 then list, #8.

10 CLS:MEMORY 4299
20 FOR #=48427 TO 48429
30 READ B:POKE #B
40 NEXT #
50 FOR #=48008 TO 48008
60 READ B:POKE #B
70 NEXT #
80 DATA 135,248,157,254,16,32,1,135,207,242,135,201

Line Feed
by J Povey

The Music Box



Half-way good

I've just spent a couple of hours playing with Super-Soft's *Music Master* program, written for the Commodore 64 by Nick Highnam.

Like all the music programs around at the moment, *Music Master* is a half-way good program — which is only to say

that it has weaknesses and strengths. Despite the program's regrettable name, its

strengths make *Music Master* the equal — if not the superior

turn the 64 into a real-time pre-set backing-track facility

is versatile and sounds good (even through an unmodified

TV set). Where *Music Master* fails down is on its sequencing

cord tracks.

to be entirely absent.

either of these programs (which, incidentally, share this

lack with QuickSave's own *Music Maker*) please let me know. I

cause my own experience suggests that the timing of a three-

channel sequence is quite tricky, since you have to read

and write to the computer's sound chip at more or less the

same moment.

Step-time sequencing is

another matter. This involves

writing notes in one form or

another and using the screen

as a sort of score. Notes are

entered in sequence but one

step at a time, often by typing in

examined). Here *Music Master*

has the edge on *MusicCalc*, even though it is still not per-

fect, by any means. The pro-

blem is with notation — *Music*

Master uses parallel lines on

which note names appear as

designed for good looks rather

than clarity. The third

Nevertheless, a composing

tool to be reckoned with — I can hardly wait for the version.

uses grids and funny bar-

graphs which look nice but are

distinctly unwelcome and not

really helpful to the composer.

The model of step-time sequencing has to be lauded for the *Music System* for the BBC Model B (a Commodore next year).

This is the nearest thing to a

real composing program, allowing you to write music to

actual slaves in authentic composing fashion. What's

more, the slaves can then be dumped to any Centronics dot-

matrix printer. I hope somebody comes up with a form of

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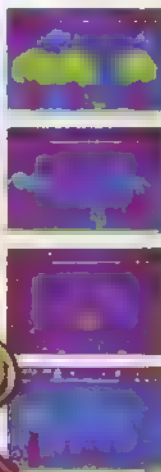
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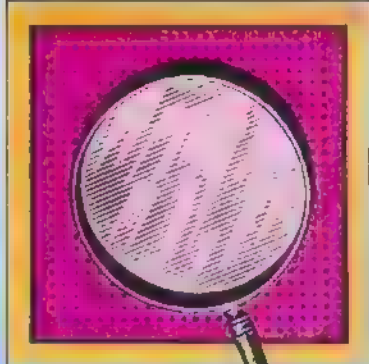
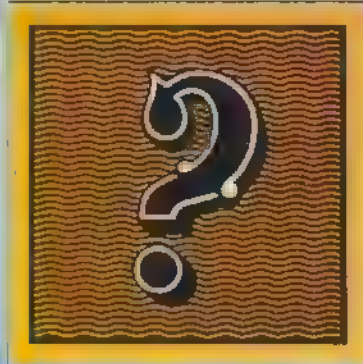
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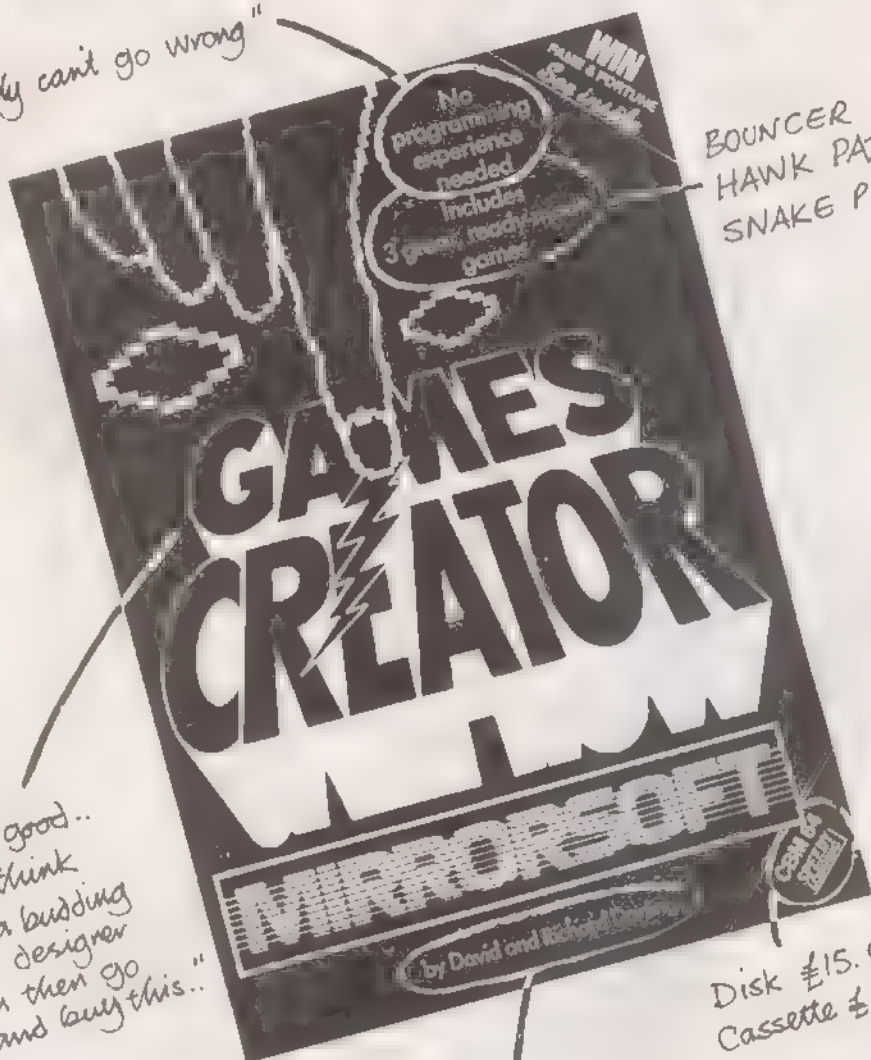
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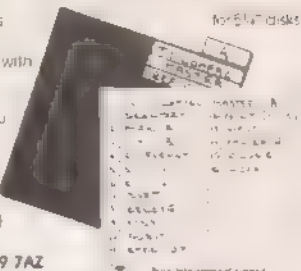
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Tony Bridge's Adventure Corner

by Creative Sparks with great interest. It has been called, by one reviewer in a rival magazine, "probably the best adventure of 1984".

The price of £14.95 may seem rather a lot at first glance, but for this you get a nice chunky box, containing two cassettes, and a fat little book. This is the complete text of the play, edited from the original 1623 version by two members of the Oxford-based development team. Besides the play, the book also contains commentary on the characters and the play itself — on its own, the book is valuable; with the program, it's sensational! In fact, there are eight programs in all. Four are graphic and text adventures. These follow the usual adventure conventions — but the graphics are beautifully drawn (by another member of the team), and are "dynamic", that is, the picture will change as the player opens doors, takes objects and so on. The four adventures are different in approach, so that the player takes Macbeth's persona in the first and third games, and Lady Macbeth's in the second and last.

Macbeth is one of the bloodiest plays in the English language, and it is thrilling to be able to "take part" in the action, and dictate it. A "strange device" in the first part of the program, is the newspaper which gives Macbeth information on the outcome of his battles — a novel but useful invention! With

the aid of this, and the text of the play, the player can guide the action along the path he knows it should take. After each section, there is a psychoanalytical interlude, during which the player will lie on the analyst's couch and answer questions on his actions. You don't have to use these extra programs, but your knowledge of the play will be deepened.

There's something here for everyone — the adventures themselves stand up against the best available for the Commodore, while the student of the play itself will learn a great deal from the book and programs.

Finally, some Help in Colditz, the adventure from Phipps. J Houghton writes from Southsea: "How do I get rid of the Guard in the Tower? I have tried everything I can!"

Well unfortunately for the poor old guard (who's only doing his job, after all), you must *kill* him with the sharp knife, and then grasp his uniform — you'll need it later on.

Phipps have just released three of their old favourites in a "Super Value Pack". It really is super value, too, as for just £7.99 you get *Magic Mountain*, *Greedy Gulch* and, one of my personal favourites, *Knights Quest* in one package — it's a steal. The company also tells me that they have recently signed a deal with Les Aventures of Paris, to translate their adventures into French. Apparently this feat has been beyond the powers of normal mortals until now, as there are a number of subtle grammatical problems to overcome. So, mes amis. Bon chance dans votre Quest, et do not blow le garlic dans mon visage!

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Fantasia Diamond on Spectrum. How do I get across the river? Tony Slater, Flat 3, 21 Dunsmuir Road, London N19.

Ghost Town on Atari. I cannot shoe the horse - I don't have the rails, and I can't open the safe with the gunpowder. Can anyone help? Chris Oakes, 62 Ashenground Road, Haywards Heath, West Sussex.

Twin Kingdom Valley on BBC. How do I get the master key from the dragon without getting burned to death? H Kulbick, 187 Duncan Road, Aylestone, Leicester.

Ship of Doom on Spectrum. How do you get the key from under the glass cover in the key room? Martin Parker, 1a Crake Avenue, Scartho, Grimsby, S Humberside.

The Castle on Spectrum. How do you get out of the chasm? Donald M Mackay, 2 Stewart Drive, Stormovale, Isle of Lewis, Scotland.

Zork's Kingdom on Vic20. I cannot get past the pit. Mrs C Fuller, 53 Hill Grove, Salendine Nook, Huddersfield, W Yorks

Keys of the Wizard on Dragon. I'm one treasure short - I can't open all the chests but I can kill the jester. S Hampson, 10 Cherry Lane, Lawton Heath, Alsager, Stoke-on-Trent, Staffs.

Hobbit on Spectrum. Where do I go after crossing the fast black river in the wooden boat? I can't get beyond the elvish clearing. Phillip Shooter, 127 Green Farm Close, Loundsley Green, Chesterfield, Derbyshire.

Woodoo Castle on Vic20. How do you go through the crack in the wall? Please help! Geoffrey Beardsell, 348 Central Park Road, East Ham, London E6

Twin Kingdom Valley on Commodore 64. How do you get the master key of the dragon, in the north tower of the Desert Castle? Mark Woolway, 17 Bertram Drive, Meols, Wirral, Merseyside

Velox's Lair on Spectrum. Where are the cars for the bath-tub? Chris Tauben, 136 Western Avenue, Dagenham, E Essex.

Hobbit on Spectrum. How do I kill the monstrous dragon, once I have got the treasure? M Bird, 35 Ashley Close, Pewsey, Wilts.

The Hulk on Commodore 64. How do I lift the ring? How do I get the wax? How do I get the big gem? Keith Willis, 2 Leicester Close, Hadrian Lodge, Newcastle-upon-Tyne, Wallsend, Tyne-and-Wear.

Pimania on Spectrum. What is the significance of the red fish? Mark Lambert, 3 Mere Farm Groves, Oxtou, Burkenhead

Mystery of Monroe Manor on Commodore 64. How do I open the wardrobe? P A Taylor, 167 Uplands Road, West Moors, Wimborne, Dorset



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Amstrad

(Figures compiled by Books & Websters)

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Atari

(Figures compiled by Books & Websters)

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BBC

(Figures compiled by Books & Websters)

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Dragon 32

(Figures compiled by Books & Websters)

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Spectrum

(Figures compiled by Books & Websters)

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Commodore 64

(Figures compiled by Books & Websters)

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Electron and BBC Micro Data

(Figures compiled by Books & Websters)

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Name

Address

My top 3: Voting Week 4

1		
2		
3		
4		

Each week Popular is compiling its own special software top ten chart — compiled by YOU.

All you have to do to vote is to fill in the form below with the names of your current three favourite software titles (or copy the form on to another sheet if you don't want to damage your magazine) and send it off as soon as possible for Top 10, Popular Computing Weekly, 12-13 Little Newport Street, London WC2H 7TP.

We will send £50 each week to the person who correctly predicts that week's top three. If there is no winner then that week's prize is automatically added to the chart on which voting is currently taking place, and so on until someone gets it right! (If there is more than one winner that week a prize — whatever the pot stands at — will be split equally between all the correct entries.)

Voting for Week 4 closes at 2pm on Wednesday December 12. Entries received after that time will not be eligible for inclusion in that week's voting.

Now Voting on Week 4 — £100 to win

Week 2: No winner — £50 added to Week 1 chart fund

1	Daley Thomson's Decathlon (Spectrum/C64)
2	Beach Head (C64)
3	Underwinkle (Spectrum)
4	Elite (BBC/Electron)
5	Kokoiari Will (Spectrum/C64)
6	Danger Mouse in Double Trouble (Spectrum/C64)
7	Knight Lore (Spectrum)
8	Sherlock (Spectrum/C64)
9	Pyramarama (Spectrum/C64/Amstrad)
10	Deus ex Machina (Spectrum)

Amstrad
Milk-Cen
Melbourne House
Ultimate
Creative Sparks
Elite
Acornsoft
Ultimate
US Gold
Ocean

Readers' Chart No 2

Event	Date	Admission	Organisers
Black Computer Show (over 1000)	Jan 15-17 (1985) 10.00am-5.00pm H. Quin - 4.00pm	£2.00 children £3.00 adults	Comp and Print Ltd 01-551 5051 01-551 1618
Micro Technology and Computers	Jan 24 10.00am-1.00pm		Computer Hardware
Apcon and Brite Computer	Feb 2-7 10.00am-6.00pm Feb 17-19 10.00am-6.00pm		Apcon 01-241 2154
Trade Show	Feb 17-19 10.00am-6.00pm		Trade Show 01-241 2154

New Releases

HAIL CAESAR

Caesar the Cat was one of the most enchanting programs I've seen (maybe I just like cats) but I later found out that it was basically intended for young children. Oh well. *Caesar's Travels* is definitely for a young market and is obviously intended to be somewhat educational — it's the computer equivalent of bedtime stories.

The story begins with Caesar the Cat in his lair trying to rid it of mice (see previous program), failing, and being chucked unceremoniously into the yard. From then on you can alter the story by a simple choice of keys at each point. For example, in one section you must decide whether to hide in a bin or run away.

Depending on the choices you make at each point, a different story is followed. Some end with Caesar in a pretty sorry state, others with him safely tucked away in a warm home. Here and there in the program there are sections where you must answer some

simple questions to further the adventure.

The graphics are charming with excellent sound effects (Caesar's purr positively glows with pleasure, his plaintive mew is truly heart-tugging). With a wide variety of possible stories the program should last quite a while before it becomes repetitive. I think if you have children under ten, they should be transfixed by this one and I might add that I was, too.

Program *Caesar's Travels*
Price £7.95
Micro Commodore 64
Supplier Mirrorsoft
Holborn Circus
London EC1P 1DQ

BLACK GOLD

All of Sinclair's recent releases have been educational and many of them have been produced by Macmillan. *Oil Strike* is your big chance to run a multinational company and seek oil.

The main section of the program concerns getting surveys on likely looking areas of rock and trying to deduce from the available visual evidence of rock type and structure whether an oil strike is likely.

As you develop more and more strikes, so the world situation develops, boosting or hampering your expansion. You must adjust the rate of production at each oil well in accordance with world market conditions.

The program combines marketing and financial strategy with simple geology as you take risks and try to maximise profits. One of those rare edu-



cational programs that the pupils should like as much as the teachers

Program *Oil Strike*
Price £9.95
Micro Spectrum
Supplier Sinclair Research
Stanhope Road
Cambridge
Surrey GU15 3PS

BUTTERFLIES

Paddington's Garden Game is a machine code collect and dodge whose only distinguishing feature is that it features a main character that looks vaguely like the famous bear. Also, marmalade sandwiches feature somewhere in the plot.

The idea is to move Paddington around a garden collecting butterflies (surely an environmentally unsound act?) and dodging various other objects like hedgehogs and wasps. The garden extends to several screens of a fairly simple kind lived up with the occasional

pond and fountain.

The sandwich lurks somewhere in the garden and gives Paddington bonus points if he can find it. It's OK and little children who are already Paddington addicts may enjoy it, but, honestly, other than the bear it's really nothing special.

Program *Paddington's Garden Game*
Price £6.95
Micro Commodore 64
Supplier Collins Soft
8 Grafton Street
London W1X 3LA

CLEANUP

Every so often I get programs sent in from readers, most of which are usually dire and are discreetly ignored. But *Litter Bug* from Solsoft is actually pretty good.

Briefly, the plot is to move a little space creature around a scrolling screen collecting rubbish bags and returning them to an incinerator. The screen is full of various sorts of rubbish, some of which is radioactive and must be quickly blasted before it explodes.

The graphics are smooth scrolling sprites and the sound is pretty good too; all in all a perfectly good game. The only problem is the whole thing looks incredibly like an early Ultimate game, so minus marks for originality. Nevertheless, there are worse ways of spending £4.95.

Program *Litter Bug*
Price £4.95
Micro Spectrum
Supplier Solsoft
3 Huntly Road
Liverpool L6 3AJ



This Week

Program	Type	Micro	Price	Supplier
Number 11	S	Amstrad	£5.50	Camel
Assembler	Ut	Amstrad	£11.50	Amor
Flex Friend	Ut	Amstrad	£7.50	Camel
Grasp	Ut	Amstrad	£8.50	Camel
Toolbox	Ut	Amstrad	£4.95	Camel
Holy Horrors	Ad	BBC	£6.99	Romik
The Land of Chalk	Ad	BBC	£4.95	Delta 4
Spooky Manor	Ed	BBC	£9.95	Acornsoft

Workshop	Ed	BBC	£9.95	Acornsoft
Potit	Art	C16	£6.99	Romik
Alard's Tome	Ad	Commodore 64	£6.99	Romik
Animal Magic	Ad	Commodore 64	£8.99	Romik
Tristan and Isolde	Ad	Commodore 64	£8.95	CRJ
Blaze	Art	Commodore 64	£6.99	Romik
Demons of Topaz	Art	Commodore 64	£5.95	Firebird
Motocross	Art	Commodore 64	£7.95	System 3
Paddington's Garden	Art	Commodore 64	£6.95	Collins Soft

Pick of the week

FROG STEW

Mikro Gen's programs have been getting better and better recently - the graphics have got bigger, the games design have improved markedly. The techniques which have improved the arcade games so much have now been introduced to create a graphics adventure with some of the most impressive illustrations yet seen.

The *Witches Cauldron* not only features excellent graphics, but has an unusual and entertaining plot. You have been transformed by the kind of magic that is part of the standard kit in adventure games, into a frog and must transform yourself, stage by stage through virtually every kind of intermediate animal until you arrive back to your human state.

You actually appear on the

screen as the animal you currently are; one interesting feature of the plot is that your choices within the adventure are limited by what animal you are. There are riddles to be solved in return for help, a new character set and intelligent use of colour not only in the graphics, but in the text itself.

It's cute rather than macho with a lot of humour, but fiendish enough for all that. It understands pretty complicated sentences and keeps me entertained for hours. What more do you want?

Program *The Witches Cauldron*
Price £6.95
Micro Spectrum
Supplier Mikro-Cen
44 The Broadway
Bracknell
Berks

blurbs says that the game has five separate game screens (this is true, but really it is only the same idea represented in different ways - in this respect it is a bit like *Life or Finnegans Wake* for that matter).

And so the idea on which it all hinges - you are a bartender (the bartender or publican is apparently known as a Tapper in America from whence this program comes - isn't English a funny language?) who must serve a mob of unruly customers, all of whom demand instant service and none of whom pay for their drinks - a bit like our office party ac-

nually.

Your barman must rush about from customer to customer serving their drinks before they overrun the bar. Not only this, but empty glasses are returned by being slid back across the bar top, you have to be there to catch them and return a full glass.

So it's a running about, dodging back and forth at ever greater speed, keeping your eyes open for customers and glasses type of game, and either that's enough or it isn't.

Program *Tapper*
Price £9.95
Micro Commodore 64

Supplier US Gold
Unit 10
Parkway Industrial
Centre
Heneage Street
Birmingham B7 4LY

SUPER FUN

In *Demons of Topaz*, the idea is that you are a spaceman and you must collect legendary sacred crystals from the demon guardians. The way through the many passages to each crystal is difficult and requires much pondering of pace and jumps - watch out if you fall because your little spaceman will crash to earth with decidedly nasty bump! (Hang on a minute, I seem to have written this before somewhere.)

Anyway, it's absolutely fantastic the way you can go through all these screens of action with different problems to be solved on each one (hang on, I'm getting confused - what month is this, what year?). Can you figure out how to get from platform to platform and collect the sacred crystals?



keep seeing this mine with penguins and kangaroos and keys you have to collect).

What amazingly exciting fun it all is! Aren't you glad you are in such an innovative, razor's edge technology-type industry?

Program *Demons of Topaz*
Price £9.95
Micro Commodore 64
Supplier Firebird
Wellington House
Upper St Martin's Lane
London WC2H 9DL

ROLLS ROYCE

The *Expert Sprite Editor* is the Rolls Royce of sprite editors, of which there are many for the Commodore 64.

Anything you want for the design of sprites is there, well documented and with all the additional information about using the sprites from Basic you could wish. Expensive but good.

Program *Expert Sprite Editor*
Price £9.95
Micro Commodore 64
Supplier Android Dreams
88 Rodnall Road
Kings Morton
Birmingham B38 8DU

Compiled by Graham Taylor

New Releases is designed to let people know what software is coming on the market. If you have a new game or utility which you are about to release send a copy and accompanying details to: New Releases, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.

This Week

Acornsoft, Beljeman House, 104 Hills Rd, Cambridge CB2 1LQ
Arnor, 76 Isham Road, London, SW16 4TF CRL, CRL House, 9 Kings Yard, Carpenter's Road, London E15 2HD, 01 533 2918
Cheatsahsoft, 24 Ray Street, London, EC1R 3DJ, 01 833 4909
Camel, Wellpark, Willets Ave, Exeter EX2 8BE, 0392 211892
Century City, 99 High Street, Dudley West, Midlands DY1 1QP, 0384 57077
Collins Soft, 8 Grafton Street, London W1X 3LA, 01 493 7070
Delta 4, The Shieling, New Road, Swanmore, Hants SO3 9PE, 04893 5800
Eclipse, 79 Ardrossen Gardens, Worcester Park, Surrey, KT4 7AX, 01 330 3116
Firebird, Wellington House, Upper St Martin's Lane, London WC2H 9DL, 01 379 6755
Impsoft, 149 Balham Hill, London SW12, 01 675 5577
Kuma, Kuma Computers, 12 Horseshoe Park, Pangbourne, RG8 7JW, 07357 4335
Megatron, Mounthel Gardens, Kenton, Newcastle upon

Tyne, NE3 3DB, 091 285 1721
Microdeal, 41 Truro Road, St Austell, Cornwall, PL25 5JE, 0726 73456
Mirrorsoft, Mirror Group, Holborn Circus, London EC1P 1DQ, 01 353 0246
Real Time, Prospect House, 32 Sovereign Street, Leeds LS1 4BJ, 0532 458946
Romik, 272 Argyll Avenue, Slough, SL1 4HE, 0753 71535
Solsoft, 2 Hurly Road, Liverpool L63AJ, 051 338 3100
System 3, 138 Carlton Avenue, East Wembley, Middlesex, 01 835 8300
US Gold, US Gold Unit 10 The Parkway Ind Centre, Heneage Street, Birmingham B7 4LY, 021 359 3020

This Week is a new section that covers all the new software coming on to the home micro market each week. All suppliers should send details of their new programs to: This Week, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.

Wally A Merry Christmas



Christmas Twin Pack with Christmas Card

Spectrum 48K Pyjamarama Automania £11.95

Commodore 64 Pyjamarama Automania £12.95

Amstrad CPC 464 Pyjamarama Master Chess £12.95

MIKRO-GEN

44 The Broadway, Bracknell, Berks. 0344 427317

AHEM, LADIES AND GENTLEMEN, BEFORE WE CONTINUE WITH THIS WEEKS CARTOON, I'D JUST LIKE TO BID THANKS, ON BEHALF OF MY PALS AT AUTOMATA, TO ALL THE EXHIBITORS AND VISITORS AT THE LAST ALLY PALLY 2X MICROFAIR, WHOSE KIND DONATIONS TO THE ETHIOPIA DISASTER FUND TOTALLED £2718. THANK YOU.

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WELL, D YOU KNOW ANY GOOD HOTELS?

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I DIDN'T BRING A CHANGE
OF PILLOW-CASE, WHO ELSE
IS COMMAND?

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SMITH: I'VE BEEN TRYING TO
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 AUTOMATICALLY
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 THOSE GUY'S AT
 THE OFFICE

SMITH: I'VE BEEN TRYING TO
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 AUTOMATICALLY
 REPLYING TO
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 THE OFFICE



INSIDE! THE SKY! MORE - NEXT WEEK!!!

